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The low achiever frequently possesses a meager background with respect to experiences that nourish achievement in school. While school success is not restricted to any one social or economic group, large groups of low achievers are usually found in low economic, densely populated areas of the city which contain a mixture of minority and ethnic groups with diverse values. Classes of low achievers include wide age ranges, and pupils are in various stages of physical development. Many children need guidance in the maintenance of good health and nutritional habits. Low achievers have a higher percentage of physical defects than do other pupils, and also manifest emotional and social instability in their everyday behavior patterns. Despite these rather negative characteristics, low achievers can and do learn. They understand concrete and factual material more readily, however, than abstract generalizations since their IQ range is usually from 95 to 90.

It is the goal of the teacher of low achievers to convey to the pupils his confidence that they can achieve academically and that their contributions are worthwhile. Other teacher responsibilities include establishing an attractive classroom environment, learning as much about pupils' home backgrounds as possible, becoming familiar with the community, setting realistic program goals, securing materials with appropriate level of simplicity, making use of community resources, and helping children understand and accept themselves and others.

Curriculum guides in reading, language arts, social studies, arithmetic, and science are presented to help the teacher in planning an effective program. Included in the guides are goals of different subject area programs, organizational suggestions, sample units, learning aids, and bibliographies.

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MEETING THE NEEDS OF LOW ACHIEVERS

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Curriculum Bulletin 402

Cincinnati Public Schools
1963

MEETING THE NEEDS OF LOW ACHIEVERS

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FOREWORD

Principals, teachers, and supervisors have long expressed a desire to meet more adequately the needs of low achievers in the intermediate grades. These pupils represent, roughly, the range in intelligence from 75 to 90 I.Q. Provisions to care for such pupils, at least partially, are made at the primary level by pre-reading classes and at the junior high school level by the modified general program. A suitable adaptation of program in the middle grades is herein set forth.

When these pupils reach the intermediate grades, they are apt to be overage, low in achievement, and frequently discouraged by repeated failure in daily work. Often they cannot use, with profit, the texts for the grade. They also require some adjustment in teaching techniques since they have more than ordinary difficulty with abstract materials and need more practice and more concrete experiences than most children before they can reach valid generalizations.

This bulletin, Meeting the Needs of Low Achievers, is a revision and expansion of one published in tentative form in 1959. It contains suggestions from teachers who used the former one. It now replaces the earlier publication.

In January, 1962, committees were appointed in reading, language arts, social studies, arithmetic, and science to review the usefulness of the tentative bulletin and the materials which had been supplied to implement it. Following this orientation meeting, the separate committees met regularly. During the summer teachers edited the materials submitted by the committees. Mrs. Ruth Douglas prepared the chapters on reading, language arts, and social studies, with assistance from Mrs. Jean Slater on the reading section. Mrs. Alma Martin prepared the chapters on science and arithmetic. After review by the supervisor who advised each committee, the final editing, under the direction of Althea Beery, Director of Elementary Education, was done by Mrs. Louise Rairden and Miss Mabel Morsbach.

The introductory chapter lists characteristics of these children, describes the teacher's role in working with these pupils, and suggests ways for him to work with the pupils. A pre-fourth grade is recommended for schools where the needs of pupils would so indicate and the organization of the school permits. Following chapters contain content and procedures for the various academic subjects. Since ability to read is so crucial to progress in all fields which make use of textbooks or verbal material, every teacher concerned should read Chapter Two and use the suggestions which can be applied to his field.

Grateful appreciation is expressed to all staff members who contributed their time and effort and especially to the members of the committees:

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This bulletin is presented to principals and teachers working with those slower-moving pupils in grades 4-6 who need an adapted program in order to progress academically. It has been prepared by teachers who have worked with such children. It is offered as a suggested program which the users themselves will modify in terms of their particular class group.

ROBERT P. CURRY
Associate Superintendent

Approved:

WENDELL H. PIERCE
Superintendent of Schools
January, 1963

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CHAPTER 1. INTRODUCTION

Characteristics of Low Achievers

Educational Background

Coupled with a lower than average intellectual potentiality, the low achiever frequently possesses a meager background with respect to experiences that nourish and support achievement in school. There is a lack of books and other learning materials in his home. There is little opportunity for the type of travel which broadens and enriches knowledge. There is often an environmental dearth of intellectual interests and skills that hold significance for learning. Inner motivation for achievement in school is frequently lacking for these reasons and because the pupil has experienced little real success in school work in the primary grades.

Socio-Economic Background

Success in school is not restricted to any one social or economic group. It is true, however, that large groups of low achievers are usually found in low economic, densely populated areas of the city. These areas contain a mixture of minority and ethnic groups who hold diverse values. Children in these areas face problems born of cultural confusion in their immediate environment. Many low achievers are also subject to frequent changes in residence and face a fairly constant problem of adjusting to new school situations.

Physical Characteristics

Classes with low achievers include a wider age range, and pupils are in various stages of physical development. As a group, they are over-age for their grade placement.

Some children will be in the resting period of development which is characteristic of children between 9 and 13, while others will be in a period of rapid growth in height and weight.

Secondary sex characteristics are beginning to develop. Girls are maturing more rapidly than boys.

Rapid, uneven muscular and physical growth causes some of them to be awkward, restless, and seemingly lazy.

Many of these children need guidance in the maintenance of good health and nutritional habits. Low achievers have a higher percentage of physical defects -- eye, ear, and teeth -- than do other pupils. Teachers need to be alert to such defects and refer children with health needs to the principal, school nurse, or doctor. In addition, every opportunity should be taken to help children build positive attitudes and good habits of personal health.

Emotional and Social Characteristics

Many low achievers manifest emotional and social instability in their everyday patterns of behavior. Past failures and frustrations in school, unstable family ties, and maladjustment between parents may be contributing factors that cause difficulty in accepting school standards. Many children have feelings of insecurity, fear, and a low level of self-esteem which they may try to conceal by behavior that is antagonistic, uncooperative, aggressive, or withdrawn.

Such pupils need a warm, friendly classroom climate where each individual is assured acceptance, respect, and support. Learning experiences should be geared toward developing respect both between the teacher and pupils and among the pupils themselves. Assigned tasks should lead first to success and the development of self-esteem, then to a realization that more complex learnings can be attempted. For many children, the school is the most dynamic influence in raising levels of aspiration and improving self-concepts.

Intellectual Characteristics

Low achievers can and do learn. They understand concrete and factual material more readily, however, than abstract generalizations, since the range in intelligence is usually from 75 to 90 I.Q. Without help, they have difficulty in seeing relationships and in making cause and effect associations. Firsthand experiences and the use of concrete materials and visual aids are necessary to build concepts. They need frequent repetition and practice to solidify learnings. They will make more progress in understanding ideas if these can be related to their immediate environment and experience. Demonstations and excursions will help in this. Because they are less adept in using the basic skills, they need much encouragement and individual help, with emphasis on remedial activities to overcome particular difficulties. Many low achievers need guidance in analyzing and improving their study habits.

What They Can Do

Low achievers in the intermediate grades, like other pupils, are becoming more curious about and interested in happenings beyond their immediate community. The viewing of television, for example, may raise questions about national, world, or space events. Such interest may be used in the classroom to relate to everyday experiences of children and to extend their understanding of the world about them.

If given encouragement, these pupils are willing to bring collections of rocks, pictures, or other interests to class and give simple explanations of them. Other pupils may be motivated to bring additional articles to collections already displayed in the classroom. These children work well with visual materials of all kinds. Given the opportunity to manipulate and experiment with them and to develop their own simple explanations, they can be guided to build deeper understandings of content and to develop feelings of personal worth.

Many times, children with limited ability in oral and written expression can illustrate their understandings and feelings in a visual, rather than a verbal, manner. When a definite provision is made to exhibit the varying contributions of many pupils, each one will find greater encouragement and motivation to participate and achieve.

The Teacher of Low Achievers

The teacher is the key person in establishing an attractive classroom environment that is physically and emotionally suitable for stimulating learning and for fostering respect for each child. In working with low achievers, it is imperative that the teacher convey to pupils his confidence that they can achieve academically and that their contributions have worth. By showing a sensitivity to the characteristics and requirements of individuals within the group, the teacher will build a program to fit their instructional and emotional needs by:

Respecting and encouraging all children, regardless of cultural differences or academic achievement

Developing with children necessary classroom standards of behavior

Establishing a friendly, encouraging climate designed to alleviate hostility and to build self-esteem

Helping children understand and accept themselves and others

Allocating responsibility to children for the care and maintenance of an attractive room

Helping children understand the importance of learning new skills, habits, attitudes, and appreciations

Developing understanding of ideas and concepts rather than requiring simply rote learning

Possessing a broad background of subject matter, which enables him to teach a concept in many different ways and to develop relationships

Setting realistic goals so pupils may be challenged and gain a feeling of success

Securing materials with an appropriate level of simplicity

Permitting children freedom to explore and to attempt to solve problems in their own way

Recognizing that these pupils will not achieve at the same rate as more able pupils

Securing help from appropriate sources for children who have serious health or emotional problems.

Ways to Work with Low Achievers

Human Relations Techniques

Teachers may find the following suggestions helpful:

Know as much about the community as possible. Become familiar with the various aspects of the area (factories, recreation facilities, institutions, stores, churches, and the like) which surround your pupils. Learn about tensions, attitudes, and habits in the community.

Learn as much as you can about the home backgrounds of pupils. Get acquainted with their parents. Absorb and use objectively the pertinent information in their cumulative folders.

Try to develop, as much as possible, a community-centered school where there is a mutual attitude of respect and helpfulness between parents and teachers. Take every opportunity to explain the goals of the instructional program to parents. Be sure that parents are informed of special programs and events that take place in the school.

Make children feel wanted in school. Make the classroom an attractive place where they assume responsibilities and develop a sense of "belonging."

Be aware of individual interests and strengths, and capitalize upon them whenever possible. This helps youngsters to realize that they have important contributions to make.

Try to promote, at the beginning of the year, an identification with the group: our room, our class, our school. Let children assume responsibility for attractiveness, arrangement of room, care of bulletin board.

Accept children for what they are, and work toward establishing a rapport between teacher and pupil, and pupil and pupil.

Make use of available community agencies when they can help solve problems; e.g., Aid to Dependent Children, Welfare Department, Juvenile Court, tutoring programs and study rooms sponsored by churches or neighborhood houses.

Make use of Pupil Personnel Services, when indicated.

Instructional Techniques

With few exceptions, low achievers in the intermediate grades have not mastered the skills of reading sufficiently to enable them to study independently or to read silently with comprehension the usual textual materials. Moreover, lack of reading power will progressively block success in school learning. Increase in reading ability should, therefore, be central in any program for low achievers. Whatever the subject is being taught, when use of the printed word is involved, instruction must include mastery of reading skills as well as mastery of particular content.

It is especially important that instruction for low achievers be pupil-centered rather than primarily content-centered. Materials, teaching techniques, and content should be selected or adapted to fit the particular needs of children. The teacher must be sensitive to the short attention span of these pupils and plan classroom programs that include a variety of activities, alternating between written work and oral, group work and individual projects, reading and demonstration.

When low achievers work in a self-contained classroom, the teacher may wish, on occasion, to alter time allotments suggested for a particular subject in order to permit an individual or small group of pupils to work on a needed skill. When pupils need additional time for development of an arithmetic concept, the arithmetic period may be lengthened for a day or two. In like manner, a language arts period may be lengthened occasionally to give additional time for developing a skill such as note-taking. The flexible organization possible in self-contained groups should be used to meet individual needs. Care must be taken, however, that no one subject is neglected in time allotment or emphasis.

Guidelines for Instruction in Subject Areas

Each area has its own particular set of skills and understandings which need reinforcing. In working with low achievers, the teacher should give consideration to the emphases which follow.

In reading, low achievers need:

Attractive materials, geared to their interest and reading ability

Development of background and vocabulary to build readiness for reading a selection

Well-defined purposes for reading

Many activities designed to expand sight vocabulary

Help in developing word meanings and word-analysis techniques

Guidance in comprehension and interpretation

Many opportunities to read easy materials independently

Occasions for hearing worthwhile stories read orally

Encouragement and stimulation to enjoy leisure-time reading.

In oral expression, low achievers need:

Occasions and support for presenting ideas spontaneously

Help in developing standards for selection of topics and contributions

Practice in organizing thoughts before expressing them

Emphasis on clear pronunciation and careful enunciation

Activities designed to increase meaningful vocabulary

Many types of oral activities to increase freedom in speaking

Activities which emphasize good listening skills

Encouragement to use speech as an expression of ideas and feelings.

In written expression, low achievers need:

Opportunities for developing ideas orally before expressing them in writing

Experience in writing co-operative class compositions before attempting individual compositions

Individual guidance in writing to meet their purposes

Practice to improve common standards of form

Motivation to build responsibility for checking their work for meaning and form

Guidance in locating reference words and other needed help

Activities which encourage individuality in writing and improvement in style

The satisfaction to be gained through creative expression.

In handwriting, low achievers need:

A display of examples of good handwriting

Practice in using cursive writing fluently, without undue attention to mechanics

Remedial practice to improve the formation of certain letters

An understanding of the importance of correct position

Motivation to build pride in achieving legible handwriting for all written work.

In spelling, low achievers need:

Practice in using simple phonetic and structural clues

Practice in locating words in alphabetical lists

Frequent review of words previously studied

Motivation to use reference sources when in need of help

Encouragement to attempt correct spelling in all written work.

In arithmetic, low achievers need:

Opportunity to use many manipulative materials to develop understanding of arithmetical processes

Frequent periods of practice and review to improve computational skills

Problems based on real life situations (home, school, community)

Careful teacher guidance in solving word problems

Opportunity to use different methods in solving a given problem and to explain their reasoning

Practice in solving simple problems without pencil and paper

Guidance in estimating reasonable answers

Practice in understanding and using arithmetical symbols

Help in recognizing their own strengths and weaknesses.

In social studies, low achievers need:

Simple textual materials within their reading level

Background experiences and visual materials to develop understandings

Organization of units into small blocks of work

Guidance in locating and organizing information

An understanding of the influence of geographical factors upon the lives of peoples

Practice in using democratic principles by participation in group activities

Emphasis on the privileges and responsibilities of democratic citizenship, within their scope of understanding

Guidance in developing an understanding and tolerance of all peoples.

In science, low achievers need:

Guidance in making simple observations and records

Opportunity to manipulate and experiment with concrete materials

Opportunity to solve simple problems within their scope of understanding

Guidance in understanding broad generalizations and cause and effect relationships

Motivating activities to stimulate and arouse their curiosity.

Evaluation

Evaluation of low achievers should measure progress made toward clearly established goals and standards. Teacher observation should play an important part in determining growth in desirable skills, understandings, and attitudes. Written tests should be only one of the techniques of evaluation. Report card grades should not be so low that they discourage future effort on the part of a pupil who is working up to his capacity; on the other hand, grades that are unrealistically high will give him an erroneous impression of his achievement. This grade should be a combined evaluation of a child's achievement in relation to his expectancy and to grade standards.

The teacher needs to give consideration to two types of appraisal: self-evaluation by the pupil and teacher evaluation. Low achievers will need much direction in reaching an honest appraisal of their strengths, weaknesses, and progress. Whenever possible, each pupil should be helped to keep visible records of progress. In each of the chapters of this bulletin, check lists to be used with individual pupils have been developed.

Objective tests, check lists, teacher observations, anecdotal records, and the appraisal of daily work and group projects are all techniques which may be used in teacher appraisal. Appropriate evaluation practices for each subject field are suggested.

Special Administrative Considerations

In some schools, very slow pupils leaving the primary grades are organized into a pre-fourth class. There are two reasons for such an organization. First, most of these children will probably need to spend four years in the intermediate grades, and a pre-fourth class makes a planned sequence possible. Secondly, the step from the third to the fourth grade is a large one, involving the passing of classes, an adjustment to several teachers, and the ability to use independently an often bewildering variety of materials.

In the pre-fourth class, pupils receive intensive emphasis on basic skills and participate in learning activities which develop background and understandings for the regular intermediate program. The content for each subject area is particularly adapted to help these children; it differs from the content developed later in regular fourth-grade classes. In this bulletin, the science and social studies sections develop special pre-fourth units in considerable detail.

Special texts and kits of materials are available for use with low achievers. The List of Approved Texts and the Supplementary Book List, on file in the principal's office, contain titles of books appropriate for low achievers. For information concerning the distribution and use of special kits of instructional materials, teachers should consult their principal and supervisor.

CHAPTER 2. READING

A Suitable Program in Reading

When pupils who are low achievers in reading enter the intermediate grades, one major curricular emphasis should be the development and improvement of reading skills in all subject areas. The more suitable reading experiences the children have, the easier and more appealing reading becomes. Often their interest in a variety of topics about which they cannot read with satisfaction supplies focal points for building an effective reading program.

Organization

The reading program must be carefully organized to help these pupils make needed progress in reading skills. Regular basic instruction is needed on levels at which the children can be successful and are challenged to acquire new skills. Materials for basic reading, for reading in content areas, and for free reading must be appropriate in difficulty, sequential in development, and attractive in both format and content. Methods must be adjusted to learning rate, and sufficiently varied to maintain interest. Reading groups must meet regularly, and many types of activities must be designed to extend skills. All of this requires thoughtful planning.

Goals

For the reading program to have significant results, both the teacher and the pupil must have clearly defined objectives. The teacher's goals are to:

Identify reading levels (Ways of developing this goal are discussed in the Intermediate Manual, Revised[1], pp. 30-31.)

Provide for individual differences and for the wide range of needs of the group

Correlate and integrate group reading with the total program

Establish a systematic method of evaluation which has been worked out co-operatively with the pupils

Arrange for each pupil to participate in every reading lesson.

The goals of the pupils should be to:

Attain confidence in reading independently

Answer simple comprehension questions after reading silently

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[1] Intermediate Manual, Revised, Curriculum Bulletin No. 400. Cincinnati: Cincinnati Public Schools, 1962.

Learn how to attack new and difficult words independently

Be able to take part successfully in word-building, meaning, and usage activities

Use reading in functional ways

See their progress

Enjoy the printed page

Develop an ever-widening range of reading interests and tastes.

Ways of Working with Children

The teacher can use a variety of methods for building power in reading. The practices listed below are suggestions which may be adapted for effective use with a particular class.

Use reading opportunities throughout the day. Set up an announcement board, and have the items read aloud for the group. Post and consult a schedule for the day's work.

Furnish a classroom library with a wide selection of books on the interest and ability levels of the pupils. Provide time for children to read independently.

Group children for regular instruction in reading, with three reading groups as the maximum.

Provide reading material that is appropriate in difficulty and attractive in form.

Continue to use those primary techniques which children need; e.g., guided silent reading, purposeful oral reading following silent reading, and vocabulary practice. (Refer to the Primary Manual, Revised[2] and manuals that accompany the primary-grade reading texts for specific suggestions in these areas.)

Teach a new technique in class before giving it as an assignment.

Introduce one point at one time, and reinforce it by practice before adding others.

Keep directions for independent reading activities simple.

Begin with short assignments which the child learns to complete.

Check each child's work regularly to encourage him to follow through on assignments.

---

[2] Primary Manual, Revised, Curriculum Bulletin No. 300. Cincinnati: Cincinnati Public Schools, 1963.

Make every pupil aware of his reading growth in concrete ways, such as by using daily records, charts, or graphs, and by holding personal conferences with him.

Show confidence in each child's ability to learn to read by calling attention to the new reading skills he has learned.

Fix new vocabulary in reading by providing many repetitions in varied, meaningful settings.

Present again and again, in as many ways as can be devised, the facts and skills which the children should retain.

Move slowly from concrete examples to generalizations.

Encourage children to look for materials related to class topics and to share information with the class.

Methods for Determining Achievement in Reading

The teacher needs to consider various sources of information to determine a child's achievement in reading. Records of past achievement are on file in the cumulative records. Objective tests may be administered to determine present reading levels. Also, subjective evaluations of teachers provide insight into the ability and reading achievement of pupils.

Examination of Records.--Examination of the cumulative record will enable the teacher to gain an insight into the child's ability by critically studying the following items:

Record of report card marks

Record of reading progress (This separate sheet supplies an accurate account of the basic readers used and identification of the child's reading skills at each grade level.)

Results of standardized intelligence tests (The city-wide group tests are administered by the Division of Instructional Evaluation at selected grade levels.)

Results of standardized achievement tests (The city-wide group tests are given to all children periodically by classroom teachers.)

Records of physical and emotional characteristics

Reports of individual psychological examinations and conferences

Record of attendance

Record of personal background: status of parents, number of siblings, and the like.

Administration of Individual Tests.--Many individual tests are available. The Gray Standardized Oral Reading Check Test[3] is an excellent one. It measures progress, diagnoses strengths and weaknesses, and locates specific difficulties. It also aids the teacher in grouping and in remedial teaching. Fifteen-minute periods spanning several days should be allotted for administering the test in preference to giving it to many children in a single day.

Observation and Judgment.--Teacher judgment and observation are often necessary to supplement the information supplied by records and achievement tests. In order to make an evaluation, the teacher may assemble a single set of readers from Grades One through Six, and ask each child, in turn, to read short passages from these texts in progression. The teacher observes word-attack skills and, through questions, determines the child's level in comprehension and interpretation.

Using all of the information that has been acquired, the teacher organizes reading groups based on varying levels of achievement. The groups should remain flexible so that a child may be readily changed to a different reading group if his present needs may be better met there. Texts for each group should be selected on the basis of suitable difficulty and challenge. No reading group should use a text that pupils have used in an earlier grade.

Sources of Help for the Teacher

Methods.--In addition to the suggestions in this guide, the teacher should consult the reading sections in the Primary Manual, Revised, the Intermediate Manual, Revised, and the manuals accompanying the readers that are being used.

Materials.--The third-grade basic readers may be used when pupils in a reading group have not previously used them. On the Basic Textbook List, available in the principal's office, teachers will find readers suggested for pupils reading two years or more below grade level. Additional sets of readers, practice books, and games are being used experimentally; the principal or the supervisor should be consulted about their availability. The school may have purchased some of the approved supplementary books for pupils reading below grade level. However, if appropriate materials are not available, the supervisor should be consulted for information about books in the Intermediate Loan Collection.

Appraisal of Fundamental Habits and Skills

There are a number of fundamental habits and skills which a good reader uses automatically; deficiency in these skills retards the progress of many low achievers. Since these habits and skills can be measured less effectively when material is frustratingly difficult, it is necessary to check these abilities when children are using materials which are relatively easy. The list of questions below will be useful in checking:

Does the child hold his book the proper distance from his eyes (12 to 15 inches) and does he seat himself so that light falls on the book and not in his eyes?

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[3] William S. Gray, Gray Standardized Oral Reading Check Tests. Indianapolis, Indiana: Test Division, Bobbs-Merrill Publishing Company.

Does he pick up the next line smoothly with an accurate return sweep of the eyes?

Does he read from left to right and from the top to the bottom of the page?

Does he read with his eyes, avoiding lip movement?

Does he perceive more than one word at a time during eye pauses, without using his finger for a marker?

Does he observe punctuation marks as an aid in getting meaning?

Does he examine words from left to right?

Does he attempt to attack new words, and with what degree of success?

Does he make use of context and word-analysis techniques in his attempts to recognize words?

If the low achiever has not learned to use some of these skills, he can be helped to face his needs realistically. Professional books on the teaching of reading listed in the bibliography at the end of this chapter will give suggestions for building needed skills and for replacing bad habits with good ones.

Vocabulary and Word-Analysis Skills

The development of effective vocabulary and of skill in word analysis is necessary if reading is to be efficient and enjoyable. The teacher must remember, however, that this is only one phase of the reading program and that other phases should not be sacrificed for it.

Many suggestions for building a meaningful sight vocabulary and for developing the ability to work out words independently are presented in this chapter. Some of the described skills will have been acquired by some pupils in the primary grades; others will need introduction and development in the fourth, fifth, or sixth grade, according to the needs of pupils. The skills are treated separately for they usually must be taught in this way to slower-moving children. However, these pupils should be encouraged to use all of the ways they know in attacking new words.

Word Meanings

Low achievers often show a limited understanding of word meanings. The general suggestions and activities presented below will give the teacher guidance in helping children overcome this limitation.

General Suggestions.--In order to foster an understanding of word meanings, the teacher should follow these suggestions:

Provide a climate that nurtures interest in new words. A time might be planned once a week when children give the most interesting words which they have met in their reading that week and read the sentence in which each word was used.

Encourage children to ask for the meanings of words. Children should be guided to skim a page and ask the meaning of any word that is not clear.

Be sure that children know the meanings of words they use. Questioning will reveal this.

Keep alert for natural opportunities to use new words. For example, the meaning of *orbit* may be introduced in a science discussion of planets. Later, in a current events discussion of space travel, the word may be used again in both noun and verb forms.

Develop the concept of a new word by using a picture whenever appropriate. Children can discuss a *weather vane* more intelligently if they have seen one. Pictures of *silo*, *barn*, *trough*, and *stanchion* may be needed with a story of farm life.

Have children draw on related personal experiences in oral discussion preceding reading. For instance, an elevator in an apartment building may be related to experiences with an elevator in a store.

Give guided practice in the use of the glossary and the dictionary. Children should have many opportunities to select the appropriate meaning of a word.

Develop new vocabulary within the context of a sentence whenever possible. This helps to strengthen pupils' understanding of the word being presented.

Activities.--The following activities are useful in building vocabulary skills:

Give meaning to the language of the story by having pupils translate it into common expressions that they customarily use.

Have pupils classify words under proper headings. Select familiar words from a story to classify; e.g.:

Fruits
Vegetables
Meats
Plants
Animals
Machines
Place Words
Time Words

Ask pupils to identify words in readers which ask questions; e.g., *why*, *where*, *how*.

Develop word meanings by having pupils build a class chart which lists, and perhaps illustrates, interesting new words met in reading.

Encourage pupils to keep individual picture dictionaries.

Give opportunities for children to dramatize or pantomime new words; e.g., *huddle*, *pivot*, *saunter*, *protest*.

Emphasize the change of meaning which prefixes and suffixes sometimes give a word; e.g.:

Prefix	Meaning	Word	Child's Illustration
un	not	unhappy	?
re	again	refurnish	?

Suffix	Meaning	Word	Child's Illustration
less	without	fearless	?
ful	full of	helpful	?

Assign pupils to select words from the story that describe a character; e.g., sad, excited, surprised, happy; or match descriptive words to characters.

Ask children to use new words in sentences when there is a need to check meaning; e.g., button box, waddled, perched.

Let them make a rebus by substituting pictures for selected words.
Example: John put the carton of milk in the refrigerator.
John put the ______________ in the ____________.

Encourage children to develop charts of interesting words: Weather Words, Circus Words, Happy Words, Sad Words, Unpleasant Sounds, Favorite Smells.

Help children distinguish opposites (dry, wet; fat, thin; hot, cold; soft, hard) through such exercises as:

Writing a companion sentence for a given one: I saw Tom go up the ladder.

Drawing lines from words in one column to their opposites in another

Supplying antonyms for words listed on the board. (At first, the teacher records; later, children may write pairs when a mixed list is given.)

Teach synonyms of familiar words (wet, moist; scare, frighten; cry, weep; smart, wise) by:

Asking children to dictate a list of synonyms for the chalkboard or a chart for a known word in a lesson; e.g., pretty: lovely, beautiful, handsome; then choosing the one which best fits the sentence

Having pupils make a chart of synonyms for commonly-used verbs, such as asked, said, walked.

Point out homonyms found in reading. Use pairs in study exercises.

(meat, meet)	I eat _____ every day.
(blue, blew)	The wind _____ through the tree tops.
(their, there)	He placed _____ books _____ on the table.

Encourage children to watch for different meanings for the same word.

My side hurts.
Write on one side of the paper.
On which side do you choose to play ball?

Prepare word puzzles: Place words and meanings in separate lists; e.g., entrance, envelope, enter, later.

				2.				
1.	E	N	V	E	L	O	P	E
				N				
	3.	L	A	T	E	R		
				E				
4.	E	N	T	R	A	N	C	E

1. Something to put a letter in
2. To go into
3. Not now
4. Door or gate

Give opportunity for pupils to choose the best meaning for a word met in reading by using the glossary or dictionary.

Have children look in newspapers for words recently seen in another context.

Review dictionary or glossary skills through games:

Dividing the class into two teams and giving a word to be found (The team first to have all members locate the word wins.)

Dictating a sentence which includes a word with varied meanings. (The children respond by locating the word and selecting the most suitable meaning.)

Use of Context

The use of context is a valuable tool if most of the words in the selection are familiar. It should be supplemented, however, with other ways of developing word meanings. Examples of its use follow.

Ask the child, after silent reading, to read a sentence in which he worked out a word from context, telling how he derived the meaning.

Read a story with repetitious phrases (such as in Just So Stories by Kipling), pause, and let a pupil or several children supply the repeated phrase.

Read aloud a selection, pause, and let the child supply the next word.

Read a story, stop at an exciting part, and ask children to tell what they think will happen next.

Have the child supply a word in an exercise in which only the beginning sound is given; e.g., The horse dr--- the water.

Let the child complete practice exercises by choosing the word that fits the sentence:

The boy played ________ in the yard. (*flowers*, *baseball*, *swimming*)
When it rains, you need an ________. (*umbrella*, *under*, *umpire*)

Write incomplete sentences on the board; let children supply words to complete them.

John ____________ television.
Mike ______ ______ to the circus.

Ask questions that will require the use of a selected new word in the answer.

Use McCullough's[4] seven types of context clues, and ask the children to find examples for a chart or notebooks:

Definition--The unknown word is defined:

We call it *caustic* because it burns the skin.
A *huge* dog is a very large dog.

Experience--The unknown word is predictable from the child's experience:

Mother told Tommy to put the milk in the *refrigerator*.

Comparison or Contrast--The new word is compared to or contrasted with a familiar one:

John is happy when the sun is out and *sad* when it rains.

Synonym--The clue is a known synonym for an unknown word:

The sun was bright and *dazzling*.

Familiar Expression--This clue requires an acquaintance with everyday expressions:

Her dress was as *white* as snow.
Let's have a *bite* to eat.

Summary--The unknown word sums up the ideas which precede it:

Everyone will march down the street all dressed up. We will have a Halloween *parade*.

Reflection of Mood or situation--The unknown word fits a situation or mood already established:

The cold rain made the children *shiver*.

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[4] Constance McCullough, "The Recognition of Context Clues in Reading," *Elementary English Review*, XXII (January, 1945), pp. 1-5.

Use filmstrips to illustrate context clues. An example is No. 5542, "What's the Word?" listed in the Visual Aids Handbook.[5]

Sight Vocabulary

Pupils use different methods in learning to recognize words at sight. To extend their basic sight vocabulary, pupils must have new words repeated many times and used in a variety of ways.

Stock of Sight Words.--The following techniques are suggested for extending the sight vocabulary.

Check on which common words the child can recognize instantly, using word lists in earlier readers and the Dolch Materials[6] listed below.

Basic Sight Words (Third Grade and Up)--220 basic words

Picture Word Cards (For Beginning Readers)--the 95 commonest nouns

Popper Words, Set One (First Grade)--easier one half of the 220 basic sight words

Popper Words, Set Two (Second Grade)--harder one half of the basic sight words

Work out a plan for mastery of these common words:

Separating Dolch words into "one-look" or "instant" words and study piles

Having the child work on only a few new words at a time to add to his "word bank"

Selecting pupil leaders to teach and check

Using a word list or small pack of word cards for homework

Planning a form of record that will show the pupil's progress

Reviewing sight words using a bingo-type game, such as the Dolch Group Word Teaching Game (Second Grade and Up).

Teach children how to study a new word in reading: look at the word carefully from left to right, noticing its striking characteristics; think about its meaning; locate it elsewhere in the story; when meeting it again, locate and reread the sentence in which it was previously used.

Use periods of review by comparing new and old words that are similar; e.g., street - strike; question - nation.

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[5] Visual Aids Handbook, Curriculum Bulletin No. 201. Cincinnati: Cincinnati Public Schools, 1961.

[6] Edward W. Dolch, Dolch Materials. Champaign, Illinois: The Garrard Press, 1960.

Determine the level at which the child can read with few errors; plan for wide reading at that level. Have the child list and learn the few new words he meets. (Betts[7] says the level is too difficult if the reader makes more than five errors in a hundred words.)

Use practice exercises to clarify words frequently confused.

Bill __________ at the lake.

Bill __________ a boat.

(was, saw)

__________ he wanted to go, his mother said, "No!"

Go __________ this door to the lunchroom.

He __________ his work was finished

(through, though, thought)

Have each child build an alphabet book or word pack, listing only the words of which he is sure; have him build another one, listing his "demon" words.

Present new words in sentences before having a story read silently.

Place a miscalled word under the correct one on the board; ask the pupil to point out similarities and differences in their appearance, and to draw a box around the part that is different.

even	tell	tap	shall	went
ever	tall	trap	shell	want

Check on the mastery of vocabulary met in readers. Have children work in pairs, pronouncing word lists in the back of the reader. Prepare tests for children and have them mark words pronounced.

Picture Clues.--The following suggestions help children to develop skill in the use of picture clues.

Use the illustrations in a reader to determine the setting of a story; its climate; the dress, homelife, and customs of characters.

Check pictures for word meanings, such as pouch of the kangaroo.

Be aware that a child who looks up at the picture every time he meets an unknown word is overusing picture clues at the expense of other ways of working out words.

Configuration.--The following are suggestions which help children retain a visual image of a word:

Have the child frame a difficult word - pillow

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[7] Emmett Albert Betts, *Foundations of Reading Instruction*, p. 449. New York: American Book Company, 1950.

Encourage children to comment on characteristics of a word that will help them remember it; e.g., ss in glass; tall letters in the middle of willow; length of word, hippopotamus; letters extending above or below the line, blink, paying.

Write words, leaving out the short or tall letters for the children to fill in:

b_ll
g_ _d
fl_ _r

sma_ _
f_ower
pre_ _y

Write two words that are similar in form; pronounce one of the words and have the child indicate it:

smile
snail

back
black

Give pupils a paper which has words of similar form listed in groups of three or four; pronounce one word for the children to underline:

snow
show
shall

play
pray
pay

Write a word as the child watches; have him trace it with his finger, pronouncing it as he traces. (This technique is for extreme cases.)

Phonics

Low achievers need help in improving their skills in attacking words phonetically. Even after they know separate letter sounds, they need much practice in blending the sounds to pronounce words.

General Suggestions.--To help develop the low achiever's power to work out new words for himself, the teacher should:

Diagnose needs by appraising the child's ability in:

Recognizing individual letters
Knowing the most common sounds which individual letters represent
Blending the several sounds represented by the letters in a word
Making vowel changes in words, such as pin, pen, pan
Trying out different familiar sounds of the letters, such as the long and short sounds of vowels, or the hard and soft sound of c and g
Using sounds of letters for a pronunciation clue rather than spelling out words or naming individual letters.

Check whether each child can name and write letters from dictation, and give a word beginning with the sound of each letter by:

Having the child make an individual list of letters to work on
Watching for any confusion of sounds or forms of m, n; b, p; t, d

Asking pupils to write the first letter or the last letter of words that the teacher dictates:

town, some, zoo; past, man, nap.

Teach the alphabet in order by:

Asking pupils to arrange a list of words in alphabetical order by first letter; by first two letters, when ready

Helping children to locate new words in a picture dictionary.

Teach a given phonic element by:

Checking to be sure the child can hear sounds in words

Seeing that two or more examples of words containing the element are in his sight vocabulary; e.g., to teach the element tr, recalling known words with the element - tree, truck, treat

Writing on the chalkboard known words containing the elements - tree, truck, treat

Asking for additional examples from the children to add to the list; e.g., trick, trip, try

Identifying the sound of the phonic elements in words rather than in isolation since the latter tends to distort sounds

Having the child add to a chart other words, beginning with tr, which he finds while working independently

Providing study exercises which require the child to apply his knowledge

Expecting the child to use his knowledge of the element in working out new words

Encouraging the child to use phonetic clues, plus context, to attempt to name a new word. For example: The pony had to trot around the ring all day. Ask the pupil to skip over the unknown word temporarily to read the remainder of the sentence, then use the known phonic element tr to work out the new word trot.

Instruct children to pay simultaneous attention to both the sight and sounds of words.

Review and teach items in this general order:

Initial consonants; final; medial

Consonant blends and rhyming elements

Familiar consonant digraphs

Use of rules governing vowel sounds:

When two vowels go walking, the first vowel usually does the talking. (mēat)

The lazy e usually makes the vowel inside long. (glide)

Variant sounds of vowels

Familiar diphthongs and phonograms

Short and long oo sound

Silent letters

Syllabication aids in pronouncing longer words.

Help child form the habit of surveying a new word from left to right, to see what part of it is familiar.

Emphasize with the child the importance of trying to pr [illegible] word.

Greater maturity is shown by the question, "Is this [illegible] than by, "What is this word?" The teacher will reme[illegible] the part he did well, even though it may be only the [illegible] sonant, or a sensible substitution.

Activities for Consonants.--The following suggestions h[illegible] skill with consonants:

Start with the fifteen consonants that never change. ([illegible] k, l, m, n, p, r, s, t, v, and w)

Post a key word or picture for each initial consonant. [illegible] cat for c, sun for s)

Do word-building exercises. Put consonants in front of [illegible] (at, rat, bat)

Give words with initial sounds selected for study. Hav[illegible] another word which begins with the same sound as a w[illegible] (ran--rat, rain)

Give words with selected final sounds. Have children n[illegible] which ends with the same sound as the word given. ([illegible] hip)

Use an old and a related new word in a couplet:

Take care where you jump.

You may get a bump.

Keep a list of reading words which begin with each cons[illegible] add new words as they are met in reading.

Let each child make an alphabet book, placing words learned on proper pages.

Ask a child for a synonym of a word which begins with certain letter or sound.

"I am thinking of a word that means to get clean. It begins with the letter _w_ (or with the same sound as _way_)." (_wash_)

Show a word; ask a child to point to other words listed which begin with the same sound; have the words pronounced.

Ask a child to supply words in exercises in which the initial consonant is given as a clue:

He played in the b _ _ _.

Ask children to pronounce the words formed by successive changes [illegible] of a consonant in a word. ([illegible])

See who can write the most words in five minutes, each successive word to begin with the last letter of previous word. ([illegible])

Teach that _q_ followed by _u_ has the sound of _kw_. Give the children a list of words, such as _quick_, _quiet_, _quilt_ and have them underline letters making the sound of _kw_.

Teach that _x_ has the sound of _ks_. (_box_, _fox_, _six_)

Teach the sound of _y_ at the beginning of a word as in _yellow_.

Teach that _z_ has a buzzing sound.

Teach that _c_ and _g_ have two sounds—hard and soft. Make a list of words which have the hard and soft _c_; have children distinguish between the two. ([illegible]) Make a list of words with hard and soft _g_; have children distinguish between the two. ([illegible])

[illegible]

Add to a list of "family" words using an initial single consonant, words beginning with consonant blends.

[illegible]

Choose the right word to complete a sentence, selecting from [illegible] beginning with the same consonant blend.

The _____ was very funny.
club clown

Change the beginnings of words to apply phonetic skill with consonant blends.

Spell to mean something you do with your nose (smell)
Spare to mean frighten (scare)

Change the endings of words:

[illegible] to a word that means "[illegible]" (flat)
[illegible] to a word that means "[illegible]" ([illegible])
[illegible] to a word that means "quiet" (still)

Ask children to pronounce words listed on board, underlining the part that looks and sounds the same. (quick, quit, [illegible])

Have pupils underline the consonants which cannot be heard in selected words. (knee, climb, write, gnat, ghost)

Teach the "f" sound for ph by having children list examples as they are met in reading. ([illegible], phone, photo, [illegible], [illegible])

Introduce and define digraphs as consonants that are used together and make a special sound; i.e., ch, sh, th, wh. List examples, such as: [illegible]

Identify phonograms—the common combinations of consonants with vowels: [illegible], etc.

Underline the phonograms seen in familiar words such as those that follow: [illegible]

Activities for Vowels—The following suggestions may be used to assist with vowels.

[illegible] more vowels.

Teach the short sounds of the vowels.

[illegible]

[illegible]

[illegible]

Have the children make words by adding different endings to consonant[illegible] vowel blends.

pen	bet	fit	hot	cap
pet	beg	fix	hop	cab
	bell	fin		can
				cut

Give each child a vowel letter, asking him to hold up his card as he hears that short sound in words the teacher pronounces. (hop, jug, fix, bed, land)

Ask children to choose from a word list those words in which they see a vowel and hear its short sound. Have them pronounce the words. (Note: Encourage children to try the short sound of the vowel first when there is no clue that it is long.)

Introduce the long sound of vowels by:

Asking children to compare these pairs of words:

can	pet	bit	rod	us
cane	Pete	bite	rode	use

Asking children to find in the word lists in their readers examples of words where silent e at the end makes a short vowel long.

Encourage pupils to look for other ways by which vowels are made long; e.g., boat, meat, meet, laid. ("When two vowels go walking, the first one usually does the talking.")

Build a chart listing words which show the ways the long sound of vowels may be printed.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Show children that oo has both a long and a short sound by:

Writing a list of oo words on the board with a key word for each sound.

Having pupils put each word under the correct vowel sound:

b͝ook   m͞oon

(wooden, goose, spoon, shook, choose, cookies, cocoon, broom, good)

Teach children that sometimes two letters work together to make a sound which neither one could make alone. (The teams oi and oy such as in joy and boil are called diphthongs.)

Vowel Rules.--The following rules help the child build power in reading:

Short-Vowel Clue: In one-syllable words containing a single vowel and ending with a consonant, the single vowel is usually short. (căt, bĕt, ĭnk, pŏt, pŭt)

Silent-e Clue: When an e is added to the end of a one-syllable word the inside vowel usually becomes long. (bit--bite, cap--cape, rod--rode)

Two-Vowels-Together Clue: When two vowels come together in a word, the first vowel is usually long; the second vowel is silent. (bōa̸t, mēa̸t, lāi̸d, pīe̸, sūi̸t)

Final-Vowel Clue: When a vowel comes at the end of a word or a syllable, that vowel is usually long. (gō, mā-ple)

Structural Analysis

Structural analysis is the study of word parts. It involves understanding of root words, endings, prefixes, suffixes, compound words, contractions, and syllables. Gradually, ability is developed in syllabication, a time-saving way of dealing with the longer unknown words that children meet in reading.

General Suggestions.--Emphasize the following practices to help pupils gain greater independence in word analysis.

Have pupils identify only those small words that are heard in longer words. Call attention to the fact that other in mother gives a clue to pronouncing the word, while seeing he in father is not helpful.

Teach only those elements of structural analysis which children are currently meeting in their reading or spelling and can apply immediately; e.g., note which prefixes and suffixes are beginning to appear in their reading. (The most common prefixes are: com, re, ad, and un; the most common suffixes are: er, est, ly, ing, ful, ness, able.)

Teach thoroughly a few ways of looking at the manner in which words are built rather than attempting to achieve many generalizations.

Utilize exercises in the spelling text which call attention to the structure of words. The spelling period offers another opportunity to look at the component parts of words.

Help children to combine other ways they have learned to work out new words along with their structural analysis--phonetic analysis, context, picture clues, configuration.

Review and teach structural patterns in this general order:
Known base words and known endings
Compound words and contractions
Known base words which change structure when endings are added by:

Doubling a consonant
Changing y to i
Dropping e

Known base words to which prefixes and suffixes are added.

Activities.--These structural-analysis activities help children to work out words independently:

Put a list of known base words with endings on the board. Have pupils underline root words and circle each ending.

looked
worker
seeing
runs
talking

opening
jumped
quickly
sooner
faster

kittens
walked
raining
teacher
slowly

Have children make plural forms by adding s and es to familiar words. (boy, girl, brick, wagon, broom; dish, wish, dress, glass, flash) Note: Words ending in sh, ch, ss, x and sometimes o require es to form the plural.

Ask children to add ing or ed to familiar verbs. (work, worked, working; jump, jumped, jumping)

Have children change words such as sing, play, and work to fit sentence settings:

See how hard the children have __________. (work)
The children ____________ in the yard yesterday. (play)
The children are _______________ a new song. (sing)

Make up sentences for which the child must choose correct forms.

The boy __________ in the choir. (sings, singing)
The children are __________ in the yard. (played, playing)

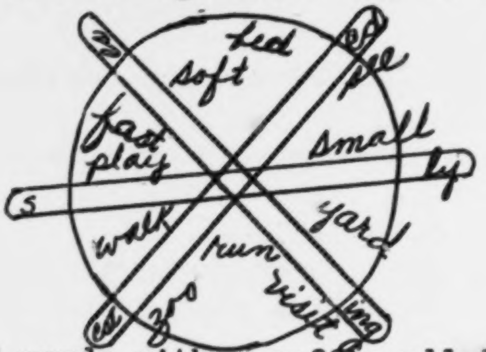
Have children find words ending in er which mean "one who __________."
(worker, helper, farmer, teacher, storekeeper)

Have children find words ending in er which mean "more." (louder, richer, sweeter, closer, darker, softer)

Have children add ly to familiar words. (lightly; nearly; softly)

See how many words children can make from a given word by adding suffixes or endings. (soft; softer, softest, softly; talk; talks, talked, talking)

Make an "ending chart." Cut a circle from oak tag. Make hands for various endings being taught. Point to a word and ask the child to select one of the endings which can be added to the word.



Ask children to find words with a suffix added to the root word.
(sadness, careful)

Ask children to find words with a prefix added to the root word.
(return, displease, depart, unlike)

Have children find words with both a prefix and a suffix added to the root word. (unkindly, unkindness, returning)

Have children learn the meaning of the commonest prefixes. Use a chart to interpret the information.

PREFIX CHART

Prefix	Meaning	Example	Your Word
un	not or opposite of	unhappy	
re	back or again	return	
mis	wrong	misspelled	
dis	the opposite of	distrust	
pre	before	pretest	
in	into or not	inaction	
fore	in front of or before	forefeet	

Compound Words.--The following activities give children practice in recognizing compound words:

Introduce the concept that a compound word is composed of root words that combine their meanings to make a new word.

Have children build compound words and use these in sentences to test their meaning.

Have children find on a page in a reading selection, a given number of compound words.

Have children join words in the first column to words in the second to make compound words; then use in sentences.

some	book
scrap	room
class	one

Have children use a compound word to complete such sentences as "A house for a doll is called a ________________."

Have children find two small words in a compound word and tell how these small words help to give the meaning of the word. (fireplace, fireside, firefly, sailboat, rowboat, fisherman, fireman)

Have children draw a ring around the compound word in a sentence; then, write its parts.

Give me something to eat. ____________ ____________

Have children use pairs of familiar words to build compound words:

house, boat -- houseboat
every, where -- everywhere
one, any -- anyone
house, school -- schoolhouse

Have children make as many compound words as they can from a list of words.

any	body	some	where
no	one	every	thing

Contractions.--Provide activities that help to emphasize the use of contractions. A few such activities are mentioned below.

Point out that contractions appear more often in conversations in reading than printed elsewhere.

Have children find sentences with contractions in readers; then, tell or write the words for which the contractions stand.

Write such groups of words as the following:

hasn't	let's	I'm
had not	let it	I was
has not	let his	I am
has no	let us	I have

Point to hasn't; have it pronounced; ask a pupil to underline the words below hasn't that mean the same. Continue similarly with others.

List contractions, as they are met in reading, on a chart; record the words from which each is made. (can't -- can not; he'll -- he will)

Ask children to match contractions with the words from which they are made:

hasn't
she's
it's
I'll
won't

she is
will not
I will
it is
has not

Syllabication.--The following suggestions help children to see and hear longer words in units or parts.

Provide many opportunities to note syllables in words by:

Asking children how many parts (syllables) they can hear in words, as the teacher pronounces them slowly:
sound, into, beginning, Dorothy (names of children in the class)

Asking the child to tap out the syllables, as he pronounces each part of a word

Letting the child feel the number of syllables in a word, by having him place his hand under his chin, as he pronounces a word

Asking children to place a list of familiar words in columns headed One-Syllable, Two-Syllable, and so on

Swinging chalk under syllables in a selected word.

department

Using diagrams to help children see syllables in words.

understand

un
der
stand

suppose

sup
pose

matter

mat
ter

helpful

help
ful

Give help in breaking words into syllables by:

Demonstrating that each syllable has a vowel sound; giving practice in deciding the number of syllables by first checking the vowel sounds in the word

decid~~e~~ elephant

de cid~~e~~ el e phant

Breaking an unknown word into parts by first taking off the prefix and suffix

un/know/ing/ly po/lite/ness

Presenting a list of words divided into syllables, then asking the children to tell how many consonants are after the first vowel in the first syllable

po lice be low ra dar
spi der po lar tru ly

Asking children to add other words to the list.

Explain and apply these three rules for syllabication:

A single consonant between two vowels is usually joined to the second vowel. (no/tice, be/lieve)

When two consonants come between two vowels, the syllable is usually divided between the two consonants. (num/ber, sig/nal)

In words ending in le after a consonant, the last syllable usually includes the consonant. (cra/dle, ri/fle)

Teach accent marks and respelling after much practice in breaking words into syllables.

Ask children to divide words into syllables and place the accent marks, using familiar words first. (ago, longer, needle, decide, David)

Ask children to notice syllables, respelling, and accent marks in the glossary at the back of the speller.

Evaluation

An evaluation of the pupil's progress in vocabulary and word-building skills may be made by using the following check list:

Does the child have a fairly wide basic sight vocabulary?
Has his meaning vocabulary been broadened?
Is he aware that words have more than one meaning?
Does he use a variety of context clues to determine the meaning of words?
Does he show desire and ability to work out new words independently?
Does he use a combination of ways to attack new words?
Does he read without excessive lip movement or finger pointing?

Comprehension and Interpretation

Comprehension and interpretation are essential phases of the reading program. Specific procedures and skills are required to develop the many facets involved in making reading a meaningful and enriching experience.

General Procedures

Comprehension and interpretation are improved through preparation for reading, guided silent reading, and group or individual check on the content of the material read.

Preparation for Reading.--The following suggestions will enable the teacher to develop a readiness for the material to be read:

Build a background of information that will help children to understand the selections by having discussions, showing pictures, or using filmstrips.

Read the story's title and subheadings for clues about its content.

Introduce difficult words or key terms needed to interpret the story, but avoid revealing the point of the story.

Examine the illustrations when they help give the setting for the story.

Set a specific purpose for reading a selection; ask, for example:

What foolish things did David do?

What wise things did he do?

Guided Silent Reading.--The following procedures are suggested by planning a reading lesson that emphasizes comprehension and interpretation:

Assign small units at first. Use such directions as:

Read till you find out ---------------.

Read this page to learn --------------.

Check comprehension by discussion and questioning following each part of the story read silently.

Increase gradually the amount of material children read in finding answers to questions. Be aware that the amount assigned depends upon the difficulty of the material and the ability of the pupils.

Ask a child who finishes early to discuss quietly with you what he found out or to frame questions to ask classmates later.

Help individuals to work out new words for themselves as they read silently.

Group Check on Comprehension.--Ways that the teacher may work with a group to determine the extent of the child's comprehension are listed below:

Have the children first answer the question which guided the silent reading.

Ask direct questions that can be answered from text; include some questions which require thoughtful answers. Avoid asking questions, however, which require shades of meaning beyond the ability of the group.

Request pupils to find and read aloud the part which answers a particular question.

Call on a child to tell in his own words what happened in the selection or what he learned through reading a particular sentence or paragraph.

Encourage the children to prove their comprehension of a short story by retelling it or dramatizing it.

Independent Activities for Comprehension.--These techniques may help the child to develop comprehension skills while he works independently:

Use simple material when introducing a new study technique.

Use the chalkboard to show a new kind of exercise. Have a child go to the board to illustrate the exact procedure for answering, as a demonstration for the group.

List several comprehension questions on the board and vary the procedure for answering them by:

Having one child read a question and explain in his own words exactly what it asks

Having all children read a question silently and calling on a volunteer for the answer.

Guide the pupils to make a check list that suggests the steps needed in writing answers to comprehension questions:

Did I read the selection carefully?

Do I know what the question asks?

Do I try to answer the question in my own words?

Do I check the book to see if my answer is correct?

Did I reread my paper to check for omitted words, correct spelling, capital letters, periods?

Plan follow-up activities in sequence of difficulty as follows by:

Using questions which require Yes-No answers

Providing questions that call for only one-word answers

Including in the question the words needed to answer

Giving questions in which the first part of the answe lows the pattern of the question. For example:

Q. Why did John ask for a job?

A. John asked for a job because ....

Assign factual questions, with the page indicated on whi is found. For example:

How old is Ruby's baby? (page 54)

Direct children to fill in blank spaces in statements an the pages on which they found the answers. For examp

A baby kangaroo is _(one)__ inch high. (page 56)

Raise simple comprehension questions which will require think through the information given before answering.

Why did the pioneer mothers use corn for most of thei

Relate "how and why" questions to the child's experience

In the story John rescued the family from a flood.

How did John show bravery?

How have you ever shown bravery?

In the story Billy had stage fright.

How did you feel when you performed on a stage or before others for the first time?

In the story Sam had a change of heart about farm life after an overnight visit there.

What new experience have you dreaded which turned out to be very pleasant?

Have children find the place in a story which proves or disproves a statement. For example:

Indian children played games very much like ours.

Development of Specific Comprehension Skills

Comprehension involves a variety of skills. It embraces not only reading for main ideas, details, and sequential events, but also skimming for specific answers and for general ideas or impressions.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Help pupils to organize the significant ideas in a story by providing guide questions. For example:

What does Betsy like to do?

What is Betsy's problem?

How does she work out her problems?

What kind of a person is Betsy?

Guide children to fill in a simple outline; later have them do it independently.

Reading for Details.--These exercises give practice in finding details in a story:

Check comprehension of details through discussion.

Have pupils check their responses by rereading, when they disagree on a particular detail.

Direct attention to specific passages in the story. For example:

Find the place that tells exactly how Rumplestiltskin looked.

Locate the paragraph that tells the exact size of the giant redwood tree in California.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

List titles on the chalkboard and explain that the titles fit specific paragraphs on certain pages of the story. Direct the pupils to arrange the titles in the order in which the paragraphs occur in the story.

Assist children to select from a story the "time" phrases that mark the beginning of each story event. Write these phrases on the board. Then have the children tell what took place at each of the various times. Next, have the pupils use these phrases as a guide to retelling the story.

Skimming.--Suggested ways to help children develop this technique are listed below:

Ask pupils to skim to find one-word answers to questions. For example:

What color was his coat?

What is an Eskimo's house called?

Have children see who can first locate the page on which the answer to a question is found.

Let individuals skim selections for a general idea or impression. For example:

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Give practice in distinguishing between general and specific terms such as:

[illegible]

lake, hill, brook -- countryside

Provide study exercises for crossing out the word that does not belong, or circling the word that belongs with the first in a grouping such as:

cup, saucer, apple, plate

Capitalize on opportunities to select the family name for a group of words, such as:

lamb, beef, meat, pork.

Guide discussion to highlight relationships. For example, pupils may reason that Juarez is associated with Mexico as New York is associated with the United States. Then they may encircle the item missing from each of the following statements:

King is to palace as Indian is to (tepee, carriage, prison).

Ball is to bounce as top is to (throw, spin, skip).

Develop questions which encourage children to relate events in a given story to their own experience. For example:

Could we build a new house here, such as Pedro did for his grandmother? Why?

Could a volcano eruption happen here? Why?

Drawing Conclusions.--Suggested ways of helping the child learn to draw conclusions from his reading are listed below:

Ask "why" questions when discussing a story that the group has read in order to bring out the cause-effect relationships. Inquire, for example, why certain characters behaved, thought, and reacted as they did. Encourage the children to give their answers in complete sentences with the use of the word "because." Have pupils support their answers by finding passages in the story which prove their statements.

Have children give reasons why a particular story turned out the way it did. Suggest other happenings in place of the major events and discuss how these changes would affect the story.

Guide discussion to emphasize that sometimes it is possible to understand why one action follows another in a story even though the story does not tell why. Point out that, on occasion, two sentences can be joined with the word "because" to show that one part tells what happened and the other tells why it happened. Proceed, then, to write pairs of sentences from a story with which the children are familiar and have the pupils combine the sentences with "because."

Discuss types of stories to decide whether the events related are fanciful or could have happened. For example, ask:

"Could Paul Bunyan have cleared the land in South Dakota, as the story described it?"

Raise questions about people. For example, after a biographical unit ask, "What famous people did you read about in this unit? How did they become famous? Did they start early in life to become famous? Did they overcome any handicaps?"

Ask questions about the values held by people. For example: "Why do you think Carver took the job at Tuskegee? Would you have felt the same way about walking to school? What would you have done differently? Why?"

Making Inferences.--The low achiever must be guided to reason from known facts. Following are examples of the kinds of questions which will serve to help him improve his interpretation of what he reads.

Ask children to tell about time and place events. For example:

How do you know --

That the story took place in the fall

That the story took place long ago

That the story took place in another country?

Frame questions about the feelings expressed by story characters. For example:

Why do you think Bob liked the mongrel best?

Why do you think the animals began to enjoy working?

Raise questions about value traits, such as:

How do you think the author feels about honesty? Why?

What may have happened in his life to make him feel this way?

Location of Materials

Learning to use the reference sources of a book is an important part of the reading program. Many topics, ideas, and words related to an assignment may be explored and experiences extended by the intelligent use of these sources.

Table of Contents.--Ways to help children get an overview of what will be read in a book are listed below:

Have the children read titles and subheads, for these can do much to rouse interest in and anticipation about a story.

Orient group members to the organization of a book. Help them to understand story groupings (units). Make them aware that stories are often grouped according to topics.

Review the table of contents to locate material, to find page numbers, and to learn the names of authors. Such questions as these may be asked: "Is there a story in this book about a farmer? Who wrote the story? On what page shall we find it?"

Encourage pupils to explore the table of contents in books on the classroom library table.

Stimulate children to explore the table of contents of books in their own libraries to find helpful reading materials, related to class topics of interest.

Index.--Ways to help children learn the usefulness of an index are listed below:

Discuss ways in which an index is like a dictionary and ways in which it is different. Summarize the children's observations on a chart. For example:

An index is located at the back of a book.

An index is always in alphabetical order.

An index usually gives the pronunciation for hard words.

An index gives the number of the page on which a subject is found.

Keep the initial lessons on the use of the index simple in order to avoid confusion. Help children to decide upon the key word to look up for a topic. Supplement class instruction with individual assistance for those who need it.

Encourage the use of more than one reference book when pupils are preparing for a panel discussion. Have them locate appropriate material by use of the index.

Give practice in the use of the index by asking specific questions, such as:

Between what two words is the subject "dentistry" found? Is it a main topic or a subtopic? On what page would you find a description of a tiger?

Glossary.--Suggestions for helping children use a glossary effectively follow:

Guide children in locating meanings in the glossary.

Give practice in using the speller glossary.

Teach how to use the respelling for pronunciation.

Help pupils to compare the treatment of words in a reading glossary and in the dictionary.

To find ideas for teaching and suggested activities for learning dictionary skills, the teacher should refer to Chapter 3, Language Arts. The topic "Developing Dictionary Skills" is in the spelling section of that chapter.

Evaluation

To help the teacher evaluate the pupil's growth in comprehension and interpretation of reading material, the following questions are offered:

Does the child show interest in ideas?

Can he understand what he reads?

Can he remember and use what he reads?

Can he relate what he reads to his own experiences?

Can he select ideas to answer questions or to prove his point?

Can he recall events in a logical or sequential order?

Can he determine main ideas?

Can he select details to support main ideas?

Is he able to reach a simple conclusion through interpretation of known facts?

Can he use a table of contents, an index, a glossary, and a dictionary to serve his purposes and needs.

Oral Reading

Values

In general, oral reading is a difficult task for the low achiever. It requires not only an understanding of the material but also careful preparation so that the listener gets the message in a satisfying way. Oral reading, however, is a practical means of imparting information in many face-to-face situations.

Done effectively, oral reading develops appreciation for well-written prose and poetry. It meets the needs of children for approval, for wholesome group membership, and for a sense of personal worth. Because slow-moving children need motivated practice in oral reading, definite periods for the specific purpose of reading orally should be planned co-operatively by teacher and pupil.

Diagnosis of Skill

During informal oral reading periods, a resourceful teacher may observe facets of the child's reading development and may draw conclusions regarding his efficiency. Procedures to use are given below.

Establish both the recreatory and the instructional level at which a given child can read effectively.

Check on comprehension and vocabulary by asking the child to read aloud the material he has studied silently that answers a particular question. This will give clues about the extent to which the child has mastered new vocabulary and has understood what he has read. If possible, the halting, embarrassed child should read to the teacher alone.

Note the types of errors and difficulties which individual children have in oral reading. The use of Gray's oral test materials[8] or oral samplings from an extra reader will give considerable insight into the varying needs of individuals.

Utilize a check list, such as the following:

Check List for Oral Reading

Holds the book correctly

Keeps the place

Enunciates well

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[8] William S. Gray, Gray Standardized Oral Reading Check Tests. (Single sheets, five forms to each of four levels) Indianapolis, Indiana: Bobbs-Merrill Company, Inc.

Phrases properly

Reads the text without additions, omissions, or repetitions

Attacks unknown words competently

Reads words accurately--beginnings, middle, and endings

Reads with expression

Uses eyes alone to keep the place

Occasions for Oral Reading

Situations which provide a genuine purpose for reading aloud stimulate children to participate in oral reading activities. Such occasions include:

Sharing a library book of which there is only one copy, a newspaper clipping, or a magazine article

Comparing statements from various sources

Reading a committee report or minutes of a meeting

Proving a point, clarifying an idea, or answering a question

Entertaining by reading a joke, a poem, or a riddle

Reading a beautiful description and identifying colorful words and phrases

Sharing an announcement, a "thank-you" note, a message, an invitation, or a letter addressed to the class

Preparing a "make-believe" radio program for reporting on a topic

Sharing an original story with another group or class

Reading materials written under frames in filmstrips

Participating in the group sharing of a story with the class

Returning to a former teacher to read a passage prepared to show progress in oral reading

Taking part in the sharing of a "cut-up" story (typewritten or from a discarded reader). Each child is given a numbered part to prepare; then, the entire story is read aloud by the group.

Reading parts in a play or "dramatizing with the book" (Refer to the end of this section to see a story which a teacher cast in dramatic form.)

Taping oral readings for future play-back. (Care must be taken to avoid embarrassing poor readers.)

Procedures for Improvement

Teachers can guide low achievers to improve in oral reading if consistent emphasis is given to adequate preparation for all planned oral reading and to its frequent use as a check on factual and critical comprehension and on interpretation. An explanation of these improvement procedures and a list of related assignments follow.

Preparation.--There are several cautions to heed in preparing for planned oral reading:

The selection must be within easy range of the child's ability.

Performance standards must be set in regard to voice control, expression, character, and interpretation.

Words must be checked for meaning and pronunciation.

Activities that might help in this preparation follow:

Discuss and chart guides for making oral reading enjoyable to the listener.

Show and discuss a filmstrip that explains the use of the dictionary and glossary.

Stimulate the making of individual word books or card files in which new and difficult words are listed, illustrated, and used in sentences. Provide time for sharing sample items.

Pair children to practice material they are preparing to read aloud.

Factual and Critical Comprehension.--Reading aloud pertinent facts, significant details, and sequential events are ways to use oral reading as a check on factual comprehension. A teacher might ask children to:

Find and read aloud a phrase, a sentence, or a paragraph that specifically answers a question, proves a statement, or makes an answer true or false

Select for oral reading the sentences that describe the sequence of events.

Equally important is the use of oral reading as a check on critical comprehension. This can be done by having the children:

Select and read orally statements that show fanciful imagination

Read aloud parts of a story that are felt to be impossibilities

Read aloud specific parts of a story that helped the pupils to predict outcomes

Locate and read orally descriptions, conversations, or events that cause certain judgments to be formed regarding a story character.

Interpretation.--Reading assignments such as those given below are examples of the ways that oral reading may be used for interpretation:

Read aloud the parts that the reader enjoyed most.

Select and share in oral reading the part that gives a colorful description.

Read the lines of a poem that give one a happy feeling. (Children should be asked to read poems only when these are easy to read and have been carefully prepared.)

Oral Reading Skills

Eye-voice span, phrasing, and expressiveness are essential oral reading skills. The ideas listed below for developing each of these skills may suggest others to the creative teacher.

Eye-Voice Span.--In order to develop this skill a teacher may use these procedures:

Demonstrate how good readers keep the eye ahead of the voice by looking up when a child gives a signal and saying as many additional words as have been read silently.

Let individual children occasionally see how many words they can repeat when a signal is given.

Encourage children to look at the audience now and then when reading aloud.

Phrasing.--This skill may be developed in these ways:

Uncover material, a phrase at a time, for word-by-word readers.

Ask children to indicate on a chart or reading matter on the board, the phrases or natural places to pause in reading.

Let children mark a typewritten copy to indicate which words belong together. Follow this with oral reading of the material.

Discuss the pauses and voice indications which are provided by punctuation marks. (One teacher wrote the last word of a sentence in red; then used red just for the terminal period or question mark.)

Expressiveness.--Expressive oral reading is essential if listeners are to enjoy the performance and if readers are to have a feeling of successful accomplishment. To develop this skill, a teacher may do the following:

Allow children to read without interruption in an audience situation even though there is an apparent need to work out new words.

Encourage children to read the story the way the characters would talk.

Provide opportunities for choral reading.

Have frequent, simple dramatizations.

Read material aloud often to the class, especially poetry.

Ask several children to read the same dialogue aloud, with each one trying to read as he thinks the person would speak.

Show how oral reading influences meaning by asking children to show various interpretations of a simple sentence:

I am the king.

I am the king.

I am the king.

I am the king.

Rewrite a story in a dramatic form for oral reading. An example of such a rewriting is shared in the following:

A Story in Play Form

(An excerpt from Miriam Clark Potter's story, "Long Ears, Bob Tail, and Fuzzy," in The Story Road,[9] a second reader)

Long Ears: "Mother we need new hats. Look at our old ones. We cannot wear them any more. They are all torn and funny looking."

Bob Tail: "Look at my funny green hat. It is all full of little holes."

Fuzzy: "I do not have a hat at all."

Mother: "Let me look in the mirror at my old hat with the red feather in it. Well, Long Ears and Bob Tail, I guess we all need new hats. Fuzzy needs one, too. He is big enough to wear a hat this year. This is Saturday and you do not have to go to school. Come along to Jungleville. We will all go down to Mrs. Bushy Tail's hat store today."

Bob Tail: "Oh good! We are going to Jungleville to get new hats. Can we stop at Kitty Kangaroo's Store? She has such nice ice cream and candy."

Mother: "Put on your old hats and we will hop down the road."

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[9] Gertrude Hildreth and Others, The Story Road, p. 113. New York: The John C. Winston Company, 1957.

Mrs. Bushy Tail: "Good Morning. I am glad to see you. This is the first time you have come this year. What can I do for you this morning."

Mother: "Well, look at all our hats, and you will know."

Long Ears: "Oh Mother! I do not want Mrs. Bushy Tail to see my hat because it is so funny looking."

Mother: "Will you please show us some hats--something pretty?"

Mrs. Bushy Tail: "Indeed, I have many hats to show you--red ones, blue ones, and green ones. How do you like the latest style in rabbit hats this year? See, there are holes in the top to let your ears stick through. My customers have told me they are much more comfortable than the old-style hats."

Development of Interest and Enjoyment

Personal reading opens doors of enjoyment and adventure for every individual. Many low achievers, however, have experienced disturbing frustrations and failures in reading. They tend to regard the process as a chore and turn to reading with reluctance. The teacher has an important responsibility, therefore, in developing interest in reading and in supplying a wide selection of materials which appeal both to the interest and the reading levels of pupils. Teacher enthusiasm is a necessary factor in establishing a dynamic atmosphere, developing reading interests, and providing stimulating opportunities for sharing stories.

Establishing an Atmosphere

Setting the stage is the initial step in challenging low achievers to read. To do this, it is suggested that teachers follow these procedures:

Use an interest inventory early in the year.

Draw on the general interest of children. Most intermediate-age children enjoy stories about animals (especially dogs and horses), fairy tales, cowboy stories, stories of rockets and space travel, farm stories, circus stories, and informational selections on science.

Appeal to the individual interests of pupils. For some retarded readers, this may mean that the teacher writes about their personal experiences from their dictation for later reading. For others, it may mean providing simplified forms of science experiments to be read and carried out or directions for constructing models or gadgets. For most children, it will mean helping them find the book which they can read on a topic in which they are interested.

Utilize all available means to introduce children to a book or story they might read; for example, a television program, a film, a neighborhood incident, a news event.

Provide books that are attractive and have strong interest appeal. These books should be easy enough to read but not childish in format or approach. The public library encourages teachers to use its resources in providing suitable reading materials for their classes; books may be selected by the teacher, borrowed for an extended period of time with the librarian's approval, and replaced when necessary with another set.

Make the reading corner inviting. A display of books or book jackets, a chart listing titles on a topic of interest, and children's illustrated book reports are usable suggestions. The children can be encouraged to take responsibility for keeping the library corner attractive and interesting.

Allow and schedule time for free reading. Books should always be available to children when assigned tasks are finished. In addition, periods of free-time reading must be scheduled regularly. During these periods, the teacher should be free to give individual help and motivation.

Set up a simple classroom library system. The children can make special cards for use in checking out books from the classroom collection for leisure-time reading at home.

Enlist the aid of the public library. At the main or a branch library, a regular appointment can be scheduled for a class. There the children may hear a well-told story, receive brief reviews on good books, learn how to find books on the shelves, and make selections for themselves, with the help of the librarian and teacher. It is wise to acquaint the librarian with the reading levels and interests of the class, before the visit.

Developing Interests

An attractive reading corner and the availability of a variety of appealing materials help to spark interest in reading. To extend interest in and enjoyment of personal reading, the teacher might follow these suggestions:

Read aloud to the class. This is one of the most effective ways to acquaint children with a new book. Take a tip from television and make the introduction vital and personal. First, of course, read the book to yourself; then, while still familiar with it, read a chapter or two to the children to give "samples" of the story.

Set up standards with the children for choosing a book. The pupil should be helped to select a book that interests him and that he knows he can read. Encourage him to try out a page or two. If he misses more than one word per sentence, suggest that he come back to that book later. Commendation of children who make wise selections will inspire others to wish to do so. Stimulating children to note the author of a favorite book and to check on the inside page to find out whether he has written other books usually results in extended acquaintance with the writer.

Give personal guidance. A reluctant reader needs to feel that the teacher takes an interest in his individual reading. Pause to enjoy an interesting episode when his chuckle indicates it. Reading a page or two for him when the material becomes difficult may maintain interest. It is of equal importance to show interest in the child who enjoys library reading. The more familiar teachers are with the books being read, the more helpful their guidance will be.

Build a design with the children for checking the types of books read. This can be a simple chart, wheel, or other device by which children may note the different kinds of books they are reading. It will help them to understand the need for balance in their recreational reading.

Encourage creative writing, having children use ideas obtained from stories that they have read.

Providing Opportunities for Sharing

Interest is broadened and enriched when opportunities are given for sharing reading experiences. Sharing periods should be varied and carefully planned. They may be scheduled within or between reading groups or at a special time. Children might:

Read to each other in pairs

Prepare an exciting episode to read aloud

Use illustrative projects such as clay models, puppet shows, dioramas, murals, or individual drawings to supplement telling about a book.

Try to "sell" a book to classmates by telling about the most interesting part, reading a funny conversation, or showing and explaining the illustrations

Enjoy a filmstrip or slides which will supplement a book read

Hold discussions about why they liked certain books

Plan for storytelling with the aid of a flannel board and cut-outs

Make book jackets or book characters as a device to interest other pupils in a book

Retell an incident from a story or a book using the comic-strip form with simple sketches

Present short skits in which book characters from many books or stories act together.

Evaluation

It is difficult to measure the progress of interest and enjoyment in reading. Appraisal by the teacher and the pupil, however, will give some indication as to the effectiveness of personal reading programs. This might be done by --

Recording the child's reading progress periodically and informally

Using a check list for appraisal, such as the following:

Check List for Teacher's Self-Evaluation

1. Have I provided an atmosphere that makes for pleasurable leisure-time reading?
2. Have I used a variety of methods to stimulate recreatory reading?
3. Have I provided a variety and range of materials?
4. Are the children doing more voluntary reading?
5. Is the children's personal reading aiding in the development of skills?

Encouraging children to keep individual records of books read (These may be charts to which certain symbols are added for books read or a book wheel on which different colors are used for each type of book read.)

Developing with the children a check list for appraisal, such as the following:

Check List for Self-Appraisal in Personal Reading

1. Do I enjoy reading books?
2. Have I read different kinds of books?
3. Is my reading improving?
4. Did I find out things I wanted to know?
5. Did reading help me with other lessons or activities?
6. Do I share my reading?
7. Did I have an interesting story to share?
8. Did others understand what I shared?
9. What was good about my sharing? How can I improve?

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CHAPTER 3. LANGUAGE ARTS

A Program in Language Development

Introduction

There is little time in the school day when boys and girls do not listen, talk, read, or write in order to carry out their learning and social activities. Low-achieving pupils, as well as others, continue to use the language skills as they become men and women in the work-a-day world. The narrow scope of their lives may demand little specific knowledge about geography or science, but the complexity of living demands that people everywhere have some facility in reading, writing, and speaking. Therefore, the ability to use the basic language skills is important for all pupils. Teachers need to accept the slower-moving pupil at his level of development and help him work toward realistic goals for improvement in writing and speaking.

Since every area of instruction is interrelated with the language arts, the teacher of slower-moving children should be aware of the many opportunities which the content subjects offer for teaching oral and written expression. Understanding of other content areas is deepened when pupils achieve a greater degree of skill in self-expression. All teachers should be aware of and receptive to the opportunities for correlation between language arts and other areas of the curriculum.

Goals

The development of the purposes of the language arts program, listed on page 59 of the Intermediate Manual, Revised, is the goal toward which teachers and pupils should work. The low achiever generally has a greater number of language inadequacies to overcome than do abler learners. He requires much guidance in developing acceptable skills and progresses at a slower rate than do average or above-average pupils. Therefore, the teacher must first give special emphasis to analyzing and diagnosing the inadequacies of each pupil. Then learning activities which will help pupils overcome their language difficulties should be provided. The teacher should plan simple techniques for helping pupils:

Develop the ability to express ideas in either oral or written form

Correct basic errors in oral expression, such as:

- Lack of sentence sense
- Use of double subjects as: The man he
- Use of double negatives
- Use of "took" with other verbs; e.g., "took and said"
- Omission of endings of words, such as wanted, wants
- Misuse of helping words; e.g., saw and seen used incorrectly
- "Yaw" for you all
- Substitution of d for th
- Substitution of f for words ending in th; e.g., wif for with

Use of t at end of word ending in th; as: wit for with
Use of hit for it.

Understand words peculiar to a given locality

Solve problems related to handwriting; confusing manuscript and cursive letter forms, or using capital letters in the middle of a word

Learn to spell correctly the commonly used, little words

Improve the carry-over of words taught in spelling

Improve speech patterns

Develop good listening habits.

In addition to the specific objectives listed above, on-going general goals should be formulated for both oral and written expression. The general goals provide continuity to the language arts program in the intermediate grades and lead pupils into a growing awareness of the importance of language skills in effective communication.

In Oral Expression.--Every child should increase his interest and ability in:

Making himself understood

Participating satisfactorily in conversation and discussion

Giving simple directions or a simple report

Delivering a simple message, as to the principal or to the nurse

Carrying on a telephone conversation with a reasonable degree of poise

Increasing his speaking vocabulary

Conducting either an informal or formal meeting
    Informal meeting: leader of a small group which is accumulating information about a given subject
    Formal meeting: chairman in charge of the meeting of a book club or other class activity.

In Written Expression.--Every child should increase his interest and ability in:

Understanding what a sentence is and using it appropriately

Understanding how a paragraph is formed and utilizing this knowledge

Writing simple letters

Writing a story or an article in a readable and interesting way

Increasing his written vocabulary

Spelling correctly

Doing written work in acceptable form and in clear, legible handwriting.

Organization of Language Instruction

The conveying of ideas through oral and written expression holds high priority in all situations that the child will meet throughout his life. Therefore, teachers must be cognizant at all times of the importance of language instruction to the total development of the child. Every learning experience should be a lesson in oral and written expression, whether the content is science, mathematics, social studies, or health. Communication skills are an essential part of every area of the curriculum.

Role of the Teacher.--The first step in organizing the language arts program is to build rapport within the classroom so that pupils will feel at ease both with their classmates and their teacher. The establishment of faith and confidence will help them earn an important and respected place in the classroom. This sense of security will enable pupils to accept essential correction in their oral and written expressions, and to profit from it.

The next step is the development of goals - a step that requires co-operative action on the part of the teacher and pupils. Needs, as they arise, should be discussed frankly and immediate objectives outlined. In planning co-operatively with the pupils, the teacher must be satisfied to work with relatively few goals at first. He will need to evaluate objectives and progress with pupils from day to day. As needs change, new goals will be added and old ones expanded.

It is most essential that the teacher keep an open mind. He should not assume that low-achieving pupils will not need nor be able to use basic skills in oral and written expression. The teacher should look upon each child as having potentials which hitherto have not been released. Hence, no child should be labeled as too slow to attain many of the language arts goals.

Materials.--Printed and audio-visual aids are necessary resources for the development of a language program. The readiness of pupils is the basis for the selection of appropriate materials which will help children expand their skill in language usage.

Printed aids for low achievers include textbooks, dictionaries, and workbooks. The recommended textbook for low achievers in the fourth grade is the third-grade text currently in use. For low achievers in the fifth and sixth grades, the present fourth- and fifth-grade texts should be used.[1]

It is important for these pupils to have access to dictionaries that are simple enough for effective use and challenging enough to promote increased skill. Two dictionaries are recommended for low achievers: the Thorndike Beginning Dictionary and a picture dictionary, to be used on an experimental basis.

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[1] Mildred A. Dawson and Others. Language for Daily Use, Gr. 3, 4, 5. Yonkers-on-Hudson, New York: World Book Company, 1955

Single copies of workbooks may be used to provide a pupil with individual practice exercises for a particular language skill that needs reinforcing. Approval of the supervisor must be secured for the use of workbooks.

Audio-visual aids furnish pertinent resource materials to the language arts program. Teachers are advised to consult the Visual Aids Handbook to order appropriate films, filmstrips, and recordings. For effective classroom use of visual aids, each teacher should have access to the following equipment:

Tape Recorder

Opaque Projector

Filmstrip Projector

Record Player

Movie Projector

Ways to Increase Facility in Oral Expression

Developing the Program

Oral language precedes and lays the groundwork for written expression. To help pupils attain maximum progress toward facility in oral communication, teachers need to build a program which emphasizes three essential aspects.

The Teacher.--Children tend to emulate those they respect. The teacher's speech, therefore, should continually demonstrate the skills which are explained in the classroom. The teacher should:

Enunciate clearly

Pronounce words correctly

Speak grammatically

Use a pleasing voice

Be a good listener

Use polite social expressions, such as "please," "excuse me," and "thank you" when speaking to children

Take part in oral expression activities, serving as a model.

Skills.--In order that the low achiever may participate effectively in oral language activities, the teacher should help each pupil to develop the ability to:

Reflect before speaking

Organize his thoughts

Select relevant materials

Suit the subject to the audience

Use language understandable to the audience

Be concise and definite

Speak audibly

Pronounce correctly and enunciate clearly

Develop sentence sense.

Techniques.--To help pupils develop competence in the oral language skills, the teacher should use the following techniques, when appropriate:

Stress the importance of content

Inventory expressional needs and difficulties; use these as the bases for practice periods to build vocabulary, to improve speech, and to correct usage

Use any suitable situation for the teaching of good usage and structure

Give practice in selecting important ideas, paraphrasing, outlining, and condensing

Individualize instruction insofar as possible

Encourage each child to participate in a variety of oral activities

Provide for constructive evaluation by the participant, the audience, and the teacher

Use the textbook as a reference

Use role-playing when appropriate.

Occasions for Oral Expression

To help the low achiever learn to speak easily and effectively, the teacher must provide frequent and varied occasions for oral expression. During these activities, the teacher should help pupils establish standards and develop a plan for sharing. He must also give direction in identifying specific skills as the children participate in more complex speaking experiences.

Classroom and everyday experiences provide many functional opportunities for children to use oral expression. Functional activities include discussion, oral reports, message carrying, interviewing, announcement-making, direction-giving and explanations, and telephoning.

Speech activities which encourage personal interpretation should also be planned for they help children develop confidence and skill in holding the attention of an audience. Interpretive activities include storytelling, dramatizations, and choral speaking.

Discussion:

Much learning is achieved through discussion. Teachers of low achievers need to provide guidance in keeping the discussion centered upon the topic under consideration and in encouraging the participation of many pupils. To insure growth in discussion skills, the teacher and pupils need to set standards for participation, such as:

Know the topic of discussion

Keep to the point

Take turns

Accept responsibility for participation

Observe courtesies

Listen attentively

Ask thoughtful and pertinent questions.

At the close of the discussion, pupils and teacher should evaluate in terms of the standards they have set.

Oral Reports:

There are many occasions for making reports in science, social studies, and reading. Teachers need to guide children in planning a report by:

Limiting the topic

Suggesting guide questions

Emphasizing the importance of telling facts in order

Encouraging the inclusion of only pertinent details

Showing how to make the report more interesting through the use of pictures, models, maps, or dioramas.

Children should progress from brief and simple reports to those that are more complex. They should learn to express the ideas read in source materials in their own words. Pupils needing help in paraphrasing will profit by developing a report in groups under teacher guidance. Group standards should be set before the reports are prepared and before they are presented. After the reports have been given, pupils and teacher together should evaluate them in terms of the predetermined standards. Check lists, such as those that follow, are valuable for identifying specific strengths and weaknesses.

Check List for Pupil Reports

Name______________________________ Date of Report____________

1. Was my report interesting? Yes___ No___
2. Did I use interesting words? Yes___ No___
3. Did I keep to the topic? Yes___ No___
4. Did I have a good beginning? Yes___ No___
5. Did I have a good ending? Yes___ No___
6. Did I say my words plainly so everyone could understand me? Yes___ No___
7. Was I polite when others were giving a report? Yes___ No___
8. What should I do better another time?

Message Carrying:

Pupils need help in learning how to enter a room quietly, how to approach the person to be addressed, and how to give the message clearly and concisely. Role-playing helps pupils acquire practice and establish standards for the efficient delivery of a message.

Pupils may serve in host and hostess roles either for functions which occur in the building during the regular school day or for activities occurring at the close of the school day, such as Open House, P.T.A. meetings, area workshops, or art shows.

Interviewing:

Children may plan interviews to gain information pertinent to a topic in social studies or some other area of study. The person interviewed might be a parent, a neighbor, a visitor from another country, or a new pupil. Pupils will need to:

Determine the information needed

Plan clear, concise questions

Ask questions in a courteous manner

Listen carefully for answers in order to record the information

Express thanks for the interview.

Announcement-Making:

On occasion, children may be asked to announce changes in the daily program or special events. Brevity and clarity of announcements should be emphasized.

Direction-Giving and Explanations:

A pupil may introduce a game to the group, explain playground rules or procedures, or explain a science experiment. The importance of accuracy and clarity should be stressed.

Telephoning:

Telephone conversation presents special problems. The child needs to learn:

To identify himself immediately

To ask politely for the person with whom he wishes to speak

To be brief and concise

To wait for the person who called to close the conversation

To say good-by pleasantly.

To make the classroom activities more realistic, it is suggested that the teacher use the film "Telephone Activities in the Elementary Grades," available through the film supervisor of the Cincinnati and Suburban Bell Telephone Company. Another appropriate film, "Adventure in Telezonia" (No. 2671), may be ordered from the Visual Aids Exchange.

Storytelling:

This activity, particularly difficult for low achievers, requires much practice. At an early stage, pupils may develop picture stories by arranging a group of pictures in order and telling about them. A pupil may use one picture and tell what happened before the action in the picture, what is happening in the picture, and what may happen later. Children may also relate mutual experiences which they check for correctness of sequence and importance of detail. At other times, pupils may retell familiar stories using a felt board to add visual interest. The characters and setting of the story are drawn and placed on the felt board. The pupil may move the characters to denote action in the story he is narrating. To help build confidence of pupils who are reluctant to participate in storytelling, the teacher may divide a story into parts. Then each child within the group is responsible for telling one part of the story.

Before the storytelling begins, the children, under the guidance of the teacher, should discuss and establish standards for sharing and evaluating. Examples of sets of standards that classes have developed are listed below:

Standards for Sharing

We choose something which is interesting.

We take time to prepare our story.

We choose a good beginning.

We keep to the point.

We tell the important events in sequential order.

We stand straight.

We try to speak correctly.

We use a pleasant tone of voice.

We stop talking when we have said the things we need to say.

Standards for Evaluating

We tell what we liked first.

We are polite and considerate when telling a person about a mistake.

Dramatizations:

Dramatic activities are closely related to storytelling. School activit present many opportunities for the dramatic portrayal of events, characters, and concepts. Play acting may be based on:

Discussion of rules involved in playground safety, in lunchroom behavior, and in other social situations that arise in school

Stories that have been read

Role-playing to provide practice in meeting such social situations as telephoning, making introductions, or apologizing for discourtesies or accidents

Television scripts

Puppet plays.

Choral Speaking:

This activity helps the timid child build self-confidence and encourages the aggressive child to understand his proper role of co-operation within the group. Poems chosen for use with the low achiever should have repetition of words or phrases to promote pupils' enjoyment and their sense of achievement. Participation in choral speaking usually fosters a growing interest in and an appreciation for poetry.

Listening

In oral language activities, listening is the other side of the coin. Although all children must be taught to listen with concentration, low-achieving pupils need direct teacher guidance in learning to develop effective listening habits. Listening skills that develop incidentally during daily activities need to be strengthened through specific devices used by the teacher to promote a better listening pattern. Some suggested devices follow.

Work toward saying things only once.

Hold children responsible for understanding announcements and simple oral directions.

Lower, rather than raise, your voice if the children are not listening.

Make the purpose for listening definite; for example, to answer questions, to follow directions, to share experiences, to enjoy what is to be heard.

Be alert to the inattentive child; bring him into the group with a question.

Plan the length of the listening period to correspond to the attention span of the group or to the type of listening activity. For example, children are able to listen longer to a story than to reports or to an explanation of an arithmetic process.

On appropriate occasions, the teacher may provide exercises to give specific practice in listening. He may:

Read a group of four words; have pupils listen to find the word that does not begin or end like the others.

boat	box	girl	baby
glass	gift	globe	glove
black	sack	tack	store

Write a letter on the chalkboard; read a group of four words, one of which begins with the letter on the board; have pupils listen for the word that begins with the letter on the board.

Give, occasionally, a list of specific instructions to be followed, such as: After number one on your paper, write the words "from," "at," and "when." After number two write "boy," "red," and "play" in alphabetical order. Continue directions of increasing difficulty. State each instruction only once; pupils write the proper response as each direction is given.

Divide the class into groups of two, asking each pair to write a short paragraph containing an absurd statement, such as:

> It was Jack's turn to bat. He stepped up to the plate and hit a home run. Quickly he ran around the six bases. When he crossed home plate, his teammates came out to shake his hand.

The paragraph is read to the group. The first child to hear the absurdity stands, states the absurdity, and becomes the next reader.

Have each child write a series of five actions to be performed in sequence by another pupil, such as:

Write your name on the blackboard.
Put an eraser on Mary's desk.
Flick the light switch on and off.
Place your speller on your desk.
Sit at the reading table.

Read a story and ask pupils to:

Make drawings of characters portrayed
Tell an original ending
Dramatize the story
Make a picture of the actions of the story
Make a flannel-graph.

The teacher should assist pupils in setting up standards for effective listening. An example of such a set of standards follows:

Standards for Listening

We sit or stand quietly.

We look at the speaker.

We look interested.

We give the speaker our complete attention.

We wait until the speaker has finished before we ask questions.

A check list for evaluating individual listening progress is also helpful. The check list should be developed co-operatively with pupils after classroom discussion. An example of such a check list follows:

Check List for Listener

Name____________________ Date________________

1. Did I give my attention to the speaker? Yes___ No___

2. Did I look at the speaker? Yes___ No___

3. Did I show my interest in what he was saying? Yes___ No___

4. What do I remember about the report?

Steps for Beginning Writing

Throughout the school day, there are numerous occasions which give pupils an incentive for using written expression. Explaining a hobby or interest, sharing news, imparting information about social studies or science, developing imaginative trends of thought -- all are occasions for pupils to express their ideas in written form. Compositions, letters, reports, and original stories and poems are the outlets which may be used. However, low achievers have difficulty in transferring their ideas to the written page. Often these pupils seem devoid of ideas, are unable to express themselves well orally, and lack skills necessary to write well. Therefore, they show little interest in written expression.

Motivation

Teachers need to work conscientiously to motivate these pupils so that their interest in writing will be sparked. Motivation helps pupils develop a positive attitude toward written expression and builds an awareness of the importance of all types of writing. The following general procedures will be helpful in developing interest in and establishing readiness for written expression.

Provide a friendly, relaxed classroom atmosphere that is conducive to good human relations.

Encourage a free interchange of ideas that creates freedom rather than pressure and builds a sense of security rather than a fear of being ridiculed and belittled.

Awaken children to the value of their own experiences by drawing them out and making them feel the importance of these experiences and feelings.

Give sincere praise for every effort no matter how crude the product.

Plan and carry out co-operatively with pupils a variety of experiences that will provide material for creative writing. Field trips and excursions are suggested examples.

Encourage children to give descriptions and explanations.

Spend time reading and interpreting many types of good literature. Stop in the reading to call attention to a particular passage or to relate it to the experiences of the children.

Discuss the beauty of color in all of nature's aspects.

Use pictures from which meaningful situations can be drawn. Discuss what is happening in the picture, what has happened, and what will happen.

Play a record and discuss the mood, feeling, and rhythm that it stimulates.

Provide opportunities for brief records.

Planning of Content

At the beginning of the writing experience, content, rather than form, should be the first consideration. The teacher should stimulate interest and thinking by suggesting ideas that are within the pupils' scope of experience, maturity, and understanding. Ideas for composition may develop from:

Labels for displays
Picture captions and legends
Summaries
Weather reports
Note writing
Brief reports
Logs of class activities
Letters of invitation, inquiry, thanks, apology
Diaries
Personal experiences
Story dramatizations
Musical lyrics
Plays

To build skill in writing original, appropriate titles to fit the content, teachers should have pupils:

Suggest titles for different parts of a story

Make titles for a bulletin board display; this could be a committee assignment

Suggest titles for a poem or story which the teacher reads

Evaluate each suggested title in light of its appropriateness and originality.

Development of Skills

While spontaneity and creative treatment of content are of high value in written expression, correctness of language usage is also necessary for the effective communication of written ideas. Pupils must learn the correct use and form of sentences and paragraphs and must develop an oral vocabulary that can be transmitted accurately and appropriately onto paper.

Sentence Sense.--The development of a sentence sense involves the recognition of a sentence as an expression of a complete thought. Low achievers should start with very simple, short sentences and progress to more complex ones, as their needs and ability grow. Pupils learn to understand the meaning and use of sentences in a variety of ways. The teacher should:

Have children answer questions in reading, science, and social studies in complete sentences

Select sentences from stories; point out the words and phrases that make the sentence complete

Have children write sentences and use words that name, words that show action, and words that describe

Have children practice writing statements and questions, using new words taken from spelling lessons and reading stories

Develop exercises that teach recognition of whole sentences:

Is It a Sentence?

1.	When the goat pranced?	no
2.	Hooker could not see a thing!	yes
3.	Soon Jack.	no

Develop exercises that teach the difference between statements and questions:

Does It Tell or Ask?

1.	Jack had an idea	tells
2.	What do you think of that beautiful sight	asks
3.	How do you feel	asks

Discuss the words that make sentences questions

Discuss the way questions and statements begin and end.

Carefully planned activities help pupils develop variety in sentence structure. The suggested card games and exercises described below are planned to strengthen specific skills.

Make sets of cards and chart directions according to the specifications below:

Directions

Put cards together to make telling sentences.
Put cards together to make asking sentences.
Find the capital letter you need for the beginning of the sentence.
Find the punctuation mark you need for ending each sentence.

Card Content

Cards containing parts of sentences.
Two cards for each capital letter of the alphabet.
A number of cards with question marks and periods.

List related words on the board. Ask pupils to see how many can be fitted into a sentence. For example: ball, pitcher, plate, glove, strike, hit, outfield.
The pitcher threw the ball over the plate and Tom hit it into the outfield.

Write a new and intriguing word on the board each day. Have pupils use it in a sentence.

Discuss with the children the meaning of a word diary. Have each child keep such a diary for a week. Chart the interesting words and the accompanying sentences that they have entered in their diaries.

Have interested children keep a file or a booklet of new words on a topic, such as Space. Have them list each word with its meaning and then use the word in a sentence.

Paragraphing.--This skill may be taught in many ways. The teacher may:

Point out paragraphs while reading a story

Copy a paragraph on the board; point out that the first line is indented, and that the paragraph is made up of sentences which tell about one thing, and that these sentences are written in sequential order

Call attention to paragraphing, whenever the opportunity presents itself, and review indentation, central idea, and sequential order of sentences

Have children, when using books to find specific answers to questions, give the number of the paragraph and the number of the page where the answers are found

Develop exercises, such as the one below, for giving practice in paragraph form.

Copy these sentences into a paragraph. Be sure to indent. Put the sentences in proper order. Begin and end sentences correctly.

Daddy and John made the fire to cook our food. We went on a picnic Sunday. Mary and I helped find sticks. Mary and I helped Mother set the table.

Appropriate developmental skills in paragraph building vary with the ability and maturity of pupils. The teacher should modify the suggested pattern for Grades Four through Six to meet the needs of pupils in his class.

In the fourth grade, low achievers should have the ability to:

Recognize a paragraph

Select titles for paragraphs

Identify the topic of a paragraph

Indent the first word of a paragraph, when writing one

Write a simple paragraph from dictation or from an outline

Write a paragraph in a personal letter.

By the fifth grade, low achievers should have the ability to:

Write a brief imaginative composition

Maintain correct sentence relationship

Write a topic sentence for each paragraph

Keep to the central idea of the paragraph

Write a paragraph about a familiar topic.

Low achievers in the sixth grade should have the ability to:

Improve in paragraphing skills

Write a good summary sentence

Write transition sentences or phrases to bridge paragraphs

Begin to arrange groups of paragraphs in sequential order.

Vocabulary.--A teacher may help pupils improve their choice of words and spelling skills by:

Encouraging them to notice and bring to the classroom colorful phrases and relevant words

Having pupils keep a card file of unusually descriptive words

Encouraging the use of new words and phrases, whenever possible

Charting "quiet," "noisy," "sad," or "gay" words

Asking pupils to list phrases and words that establish moods

Having pupils keep a list or chart of "tired" words, such as pretty and nice

Encouraging pupils to develop word files on units, special days, seasons, sounds, places we go.

Children help themselves in extending written vocabulary through:

Keeping a co-operatively compiled list of words, appropriate for a certain topic

Developing an individual or a class word-box file

Developing individual or class dictionaries, with and without pictures

Using cumulative spelling lists.

Language activities, carefully designed to improve a specific skill, may be developed to meet the emerging needs of the group. The activities which follow emphasize the development of certain skills.

Synonyms and Antonyms:

The card games and exercises described below will help pupils broaden their use of picturesque vocabulary.

Make sets of cards and chart directions according to the specifications below:

Directions

Find all the words on the yellow cards that mean almost the same as the words on the white cards. Place them in parallel columns.

Card Content

Yellow Cards

giggle
chuckle
replied
questioned
lovely
splendid
tiny

White Cards

laugh
asked
answered
fine
pretty
little

Ask pupils to write the words that mean the opposite of fine, nothing, slowly, unusual, safe, lend, rough, sad.

Have pupils find a synonym and an antonym for each word below:

gained
harm
success
called

said
pretty
go
title

Contractions:

The card game described below will help pupils develop skill in the use of contractions.

Make sets of cards and chart directions according to the specifications below:

Directions

Match the white and yellow cards.

Card Content

White Cards	Yellow Cards
can't	can not
don't	do not
isn't	is not
aren't	are not
hasn't	has not
won't	will not
he's	he is
it's	it is
weren't	were not
wasn't	was not
couldn't	could not
doesn't	does not
we're	we are

Abbreviations:

The following card game will give the children practice with writing abbreviations correctly.

Make sets of cards and chart directions according to the specifications below:

Directions

Match the white and yellow cards correctly.

Card Content

White Cards	Yellow Cards
Mr.	Mister
Sun.	Sunday
Jan.	January
Ave.	Avenue
St.	Street
U.S.	United States
Ky.	Kentucky

Vocabulary Development:

Can You Supply the Word? is the title given to the exercises that are described below.

Have pupils draw a picture or describe the action of each word in the following groups; add new words to each group:

dump, unload, remove
fix, repair, mend
dive, leap, drop
scatter, divide, separate

Ask pupils to write one word that has to do with baseball for each of the letters below.

b________________
c________________
f________________
g________________
h________________
l________________
o________________
p________________
r________________
s________________
w________________

Assign pupils to write as many words as possible to describe a specific noun. For example:

Dog: shaggy, big, mad, playful

Boy: tall, polite, talkative

Display a picture; then let the children write as many words as possible to describe the main object of the picture.

Usage:

The following activity serves to identify and bring to the attention of pupils some of the errors frequently made by the group. Participation in this activity should be carefully guided to emphasize improvement in correct usage rather than to imply criticism for individual mistakes.

Appoint children to become language detectives, with each being deputized to record one mistake that a class member has made during the week. At a given time, a detective reports the recorded mistake to the class and gives its correction. The mistakes are tabulated. For the following week, instruction, discussion, and activities are geared toward the correcting of these mistakes.

Establishment of Standards

The initial writing effort must be brief, to the point, and concrete. As progress is made, material may be increased in length and difficulty, form and spelling may be stressed, and paragraph structure emphasized.

Need for standards may be established by comparing a well-written and a poorly-written composition. These writings, without identification, may be posted on the bulletin board, duplicated for distribution, or shown on an opaque projector. From the comparative study, generalizations may be drawn and standards established.

The resulting rules may be short and simple or long and all-inclusive depending upon the needs, the ability, and the maturity of the children. Examples of both types of charted rules follow:

Our Rules for Writing

1. Begin each sentence with a capital letter.
2. Punctuate each sentence correctly.
3. Write so the material can be read.
4. Try to use only the best English.
5. Read over the work and correct any mistakes.

Rules for Writing

1. Be sure that every sentence expresses a complete thought.
2. Begin each sentence with a capital letter.
3. End statements with periods.
4. End questions with question marks.
5. Indent each paragraph.
6. Be sure that each paragraph has one main thought.
7. Be sure that every sentence in the paragraph tells about the main thought.
8. Be sure that the sentences are in the proper order.
9. Write so that the work can be read easily.
10. Spell all words correctly.
11. Use words that will make the sentences sensible and interesting.
12. Use the best of English.
13. Read over your work and correct any mistakes before handing it in.

Evaluation

Evaluation should be a co-operative effort on the part of the teacher and pupils. In light of the standards set, a check list may be developed so that weaknesses and strengths may be ascertained. Such a suggested check list follows:

Check List for Evaluation

Did I write my name on my paper?

Did I begin important words in the title with a capital letter?

Did I remember to use a margin?

Did I use capital letters where needed?

Did I end each sentence correctly?

Did I write the story in proper sequence?

Did I indent the beginning of each paragraph?

Did I keep each paragraph about one central topic?

Did I spell all the words correctly?

Did I use interesting words?

Did I reread and revise my work?

Guidance in Specific Types of Written Expression

Types of Functional Writing

All pupils need to be able to impart information clearly and accurately in written form. Classroom assignments require pupils to write paragraphs of explanation, book reports, descriptions of experiments, and other informational reports. The low achiever is often hampered by his inability to use the writing skills. He needs many occasions to participate in simple writin experiences which will increase his skill in selecting pertinent information and in expressing ideas in his own terms. His first efforts may be only a few sentences related to a given topic. Writing assignments for these pupils, therefore, should be clearly defined and should be limited in scope and length according to their ability.

Captions and Legends.--Writing titles and legends for displays or exhibits will often help a pupil with limited skill in writing to express ideas in his own words. The pride experienced in seeing his work on display helps to motivate future writing experiences. In writing captions and legends, emphasis should be given to legibility, correctness of form, and accuracy and appropriateness of information.

Reports.--Pupils are required to make reports for almost every area of the curriculum. Purposes for reports may vary; they may impart information or record answers to questions or problems under consideration. For low achievers, the purpose should be clearly established, and guidelines for developing the report should be discussed.

Pupils who experience difficulty with writing often profit by developing a group report under teacher guidance. Together, the group may consider some of the steps in selecting the content for a good report. The following list suggests some basic procedures:

Define the topic carefully.

Select the main ideas to be developed.

Include only the information that is pertinent.

Arrange information in a logical order.

Write the report in your own words.

Group work helps pupils develop a working pattern of procedures to use in writing reports. After this has been established, they should be encouraged to write simple, individual reports.

Standards, developed co-operatively by pupils and the teacher, should reflect the needs and abilities of the group. The standards have a twofold purpose. They provide guidelines for writing reports; they also may be used to evaluate progress and identify specific points of strength and weakness.

Letters

The ability to write effective letters is a skill that individuals use throughout their lives. To initiate motivation for letter writing, the teacher should:

Build interest

Provide occasions for writing letters that will be sent

Emphasize content rather than form

Encourage a natural style of writing

Develop, with the class, attainable standards.

Once low achievers have been motivated to attempt the letter writing, they will be interested in writing letters that are acceptable. To do this, they must be aware of the different kinds of letters, the purpose that each serves, and the form that each requires.

The Letter Form.--It is essential that children learn:

The basic parts of all letters, their use, and their sequential order: heading, greeting, message, closing, signature

The form required for each part as to position, punctuation, and capitalization

The way to address an envelope

The difference in purpose and form of business and personal letters.

Suggestions for Teaching.--The following activities are suggested for building skill in letter writing:

Develop charts with the class that give pertinent step-by-step guides for writing letters.

THE ADDRESS TELLS --

1. The name
2. The house number and the street
3. The city and zone number
4. The state

AN INVITATION TELLS --

1. Whom you are inviting
2. When the guest should come
3. Where the guests should come
4. What the guests will see or do

Use real purposes for writing letters, such as:

- Inviting another class to a program
- Thanking the custodian for a special service
- Communicating with an absent pupil
- Requesting permission to visit a place of interest
- Sharing news with a pen pal.

Prepare with the children a composite letter.

Read two kinds of letters to the children; guide them into noting likenesses and differences.

Vary personal letter writing by giving the class the opportunity to write an imaginary letter from a pet, from a figure in the public eye, or from a person from outer space.

Have pupils copy a letter similar to the one below. Put capital letters and punctuation marks where they are needed.

cummins school
824 wm howard taft rd
cincinnati 6 ohio
october 6 19__

dear dr carroll

thank you for telling us how to take care of our teeth our class enjoyed your talk very much will you come again sometime

yours truly

the fourth grade

Stories

Most low achievers have been building composite stories with the teacher since kindergarten days. However, writing individual stories may be a new experience for many of these pupils. The process involved in writing stories independently must be initiated, motivating activities must be planned, individual help must be given as the stories are developed, and ways of improving the stories must be worked out co-operatively.

Story writing will be more satisfying if the teacher takes time to develop ideas and to share experiences before pupils begin to write. To broaden the limited background of pupils, the teacher needs to provide a wide variety of imaginative and fanciful ideas around which the children can build their stories. Then, he must help pupils develop an appropriate vocabulary, use sentences and paragraphs correctly, select a title, and establish standards.

Topics suitable for intermediate-grade pupils are suggested below under grade levels. However, each title may suggest many other topics of interest to children.

Pre-Fourth Grade

- Dinner at Our House
- Pets at Home
- Skates and Bikes
- Friends of Mine
- My Family

Fourth Grade

- My Friends
- My Classmates
- Beginning a New Day
- Evening Fun
- Make Believe
- Magic Sounds
- Clowns and Elephants
- Springtime

Fifth Grade

It Happened This Morning
Moments to Remember
My Job Around the House
Holidays I Like and Why
Our Gang
Book Reports

Sixth Grade

Money of My Own
At the Dinner Table
Heroes
Day and Night Sounds
How I Feel When....

Motivation.--When a child is motivated to write imaginatively about a role that he is assuming or about an inanimate object that comes to life, he feels freer to express personal feelings and to present his contribution to the class. He will dare to be original if he feels that criticism from his peers or from adults will be constructive. Therefore, teachers should plan activities from which free, uninhibited expression may develop. Situations, such as the ones described below, may motivate a story.

A classroom discussion of animals that hibernate may lead to a fanciful tale. This tale may be about the things that happen when an animal parent rounds up the young ones who will hibernate for their first winter.

The reading of a story about seasonal changes may motivate the writing of an imaginative nature study about the feelings of a tree as it lives through the four seasons.

The recognition of a classmate's birthday may suggest an account of a birthday celebration; the story may be a true one or may be purely fanciful.

The search for a mislaid book may suggest a story that tells the adventures of the lost book.

The finding of a long-lost pencil in a janitor's trash pile may lead to a story told by the pencil, describing its experiences as it lay unused, abused, and forgotten.

A study of life in a foreign land may inspire a child to project himself into the position of an Eskimo child at a trading post, a Mexican on the way to market, or a Swiss boy leading cows to pasture.

The reading of a story about the history of our nation may stimulate a child to impersonate someone from another period of time and, in that role, to write his adventures and observations.

Development.--A picture of a vacation-bound family packing the car may be used as motivation for a story. As the picture is shown, the teacher may ask such questions as the following and list suggested vocabulary.

1. How do you think the children feel about going?	happy, glad, excited
2. How does the father feel about going?	tired, happy
3. How does the dog look?	sad, ________, ________
4. What do you think the family will do on vacation?	go fishing, swim in the ocean, play ball, go boating
5. What would be a good title for this story?	A Vacation in the Summer A Vacation at the Ocean

On the following day, pupils may look at the picture again. The teacher reviews the vocabulary. He reviews the standards for writing a story. Then, the children are given a few minutes to think about what they are going to write.

When pupils begin to write their stories, the teacher will need to work with them. If a pupil cannot locate quickly a word he needs, he may write only the first letter of the word and leave a blank space until help is available. As the year progresses, pupils should achieve some degree of independence in writing. Some children will be able to work with little teacher guidance; other, however, will continue to need much encouragement and help from the teacher.

After the story is written, the class should review each standard. As a standard is read, e.g., "We should start every sentence with a capital letter," pupils should look over their papers to make corrections. When another standard is read, pupils check their stories and make needed corrections.

There are a number of other techniques to help pupils identify errors. Each individual may read his own story. Children may pair off, with one pupil reading his story aloud to his partner; the two may then make corrections together. Pupils may exchange papers and proofread them for errors.

After pupils have corrected mistakes in their own stories, the teacher should read the papers for final checking. As a final step in writing a story, the children should copy the stories in their best handwriting, being sure that mistakes are corrected.

Improvement.--After pupils have had some experience with story writing, they will want to improve the quality of their stories. Practice with sentence exercises develops skill in using a variety of sentence patterns. Looking together at one story helps children see how sentences may be improved. Permission should be secured, however, before using any child's story. It may be copied on the board or projected on a screen. Pupils may suggest different ways of saying the sentences. Gradually, they will see how the use of compound subjects, verbs, or sentences improves the quality of the story. An exercise, such as the one given below, will be helpful.

Make two short sentences into one long sentence.

Planes need air. People need air.

In space you will find no heat. There is no air.
Airplanes have to be strong. They have to be fast, also.
We saw pictures of bears. We saw pictures of other wild animals.
Some crows were flying and cawing. Some crows were sitting on the fence.
The airplane crashed on the runway. The airplane burned up.

As the teacher corrects papers, he should note areas of special need. From these, he will be able to motivate the pupil to use planned practice exercises to overcome specific language difficulties. The language textbook or the teacher's file will provide appropriate practice exercises. A file of such exercises may be built from workbook pages and from exercises which the teacher develops to meet the needs of particular individuals.

Activities, such as those suggested below, help motivate children to work independently in developing simple plots and in increasing written vocabulary.

Authors:

On separate cards write the beginning of a story. Children may select one card and after reading may:

Write an ending

Write what might happen next

Finish the story.

Picture Questionnaire:

Choose pictures that will arouse interest. Conceal any caption, legend, or story that might accompany the picture.

Write thoughtful questions that require creative answers for each picture. Use such questions as:

What will they do next?
What is the conversation that they are having?
Where are they going?

Pick-a-Card-and-Do Box:

In an attractive box, place numbered cards with instructions for activities. Examples of cards follow:

Write the days of the week and their abbreviations.

Make up a short story to explain how one day was named.

A compound word is a word made of two words, as _farmyard_.

See how many compound words you can write.

Homonyms. Write words that sound alike but are spelled differently and have different meanings. You may draw pictures to show each word.

Examples of Original Stories.--The following stories are examples of creative writing done by low achievers in Grade Four.

MY LITTLE FRIEND

I have a little birdy friend who lives in a forest. He and I write letters to each other. The other day he wrote to me and invited me to come and visit him. I answered his letter and said I would. So the next day I went to visit my little friend.

He had a surprise waiting for me. He said he was going to take me to see some of his friends deep in the forest. So we started out. The first house we came to was Mrs. Cardinal, but she wasn't home, then we went on. Next we came to Mrs. Bluebird's and she wasn't home either. We went on to six or seven more friends' houses but no one was home. So we went back to my friend's nest, looked, and all of his friends jumped out from behind leaves, for today was my little friend's birthday and he had forgotten all about it!!

The End

THE SPARROW'S ADVENTURE

Once upon a time I was walking through the woods. I saw a little sparrow go flying into the woods, so I thought I would follow it. I saw that it had a great big worm in its mouth. He took it to his nest and ate it. After he ate, he went to see Billy Wren who lived next door to him. Billy Wren invited him to share a great big fat beetle, but Bobby Sparrow told him he had already had his lunch. When he finished visiting Billy Wren, he found Jerry Bluejay, Mary Humming Bird, Greg Robin, and Betty Red Bird, and they all played a game of bird tag. Bobby Sparrow won the game.

Then he went home and his mother, Martha Sparrow told him that they were going to have worm soup for supper that night. Bobby's mother knew that Bobby loved worm soup. After supper Bobby Sparrow settled down in his warm nest and went fast to sleep.

The End

MR. BEAR AND THE SUN

Long, long ago, before you were born, there was a bear. He had lived a hundred and fifty years long. He was proud of himself, for he argued with anyone who said he was older than he was.

One day while the bear was walking in the deep, dark woods, suddenly it started to get lighter and lighter and lighter. The bear was startled. He looked up in the sky and he saw a bright ball of fire. It hurt his eyes. He looked down because he saw spots. Then he said, "I bet I'm older than you are."

"Oh no, you're not," said the sun.

"I am!" said the bear.

"You aren't," said the sun.

"I am," insisted the bear.

"Well, I am more than a thousand years old," said the sun.

"My gosh, you are!" squeaked the bear. "I'm only a hundred and fifty years old," and he felt like a heel.

The End

BOBBY THE BIRD

One day Bobby Bird was sent by the king of birds to Tabby, the nurse. The king was very sick. Bobby got to Tabby's at two o'clock. Tabby was giving Jane, the Tweety Bird, a pill. She asked Bobby what he wanted.

Bobby said, "The king is very sick. He has a cold."

"Oh my," said Tabby, and she hurried to the castle.

Tabby gave the king some pills, and he got well. But Tabby got sick! The pill looked so bad, and the king looked so bad when he ate it, and Tabby fainted. She was taken home and put to bed.

But soon she got well again.

The End

Poetry

Poetic expression encourages depth of thought and contemplation of the good and beautiful. The vivid auditory and visual images found in poetry sometimes help the low achiever to develop interest and increased skill in reading. Poetry also serves as an excellent emotional release. It can comfort, arouse, or subdue children. In addition, poetry makes it possible for these pupils to enjoy the land of make-believe and gives a spark to some of their everyday experiences.

Enjoyment.--There are many kinds of poetry which enrich the personal background of the child. They are listed below.

Humorous poems. These may serve to relax the child in his struggle to achieve academically; they will also aid in developing an appreciation for a wider range of moods in poetry.

Lyrical poems. Verses that have a lilt and contain nonsense or repetitious words give the child a light, happy feeling; this type of poetry also gives pupils an appreciation of descriptive vocabulary.

Unrhymed poetry. This kind of poem brings the realization that poetry does not always have rhyming lines; the idea, not the rhyme, receives major emphasis.

It is most important that poetry be read to children by skilled readers. The teacher should become familiar with the vocabulary, rhythm, and meaning of the poem he is planning to use. He should help pupils capture the meaning and the mood of the poem.

Poetry should be first introduced for sheer enjoyment, for a child is able to sense meaning long before he can express it. All selected poems should contain ideas that are familiar to pupils.

Poems that are general favorites may be memorized in class with all pupils working together. Through listening to numerous readings of a poem, children soon will become familiar enough with it to quote lines from it.

Teachers should also encourage each pupil to memorize poems that appeal to him. However, no child should be forced to memorize poems for a grade, for pressure defeats the purpose of this experience by developing a negative rather than a positive attitude toward poetry.

Motivation for Writing.--Teachers may build motivation for writing poems by:

Encouraging pupils to suggest picturesque language; to describe colorful, inspirational pictures

Asking the class to recall picture words after hearing a poem read orally; the poem should contain all types of sensory images

Capturing the children's mood by reading poems that are appropriate to a happening: the first snowstorm, a sudden downpour, a windy day, new shoes, a holiday feeling

Seating pupils informally during poetry sharing periods, with the reader seated with the group

Developing readiness for creativity by asking questions; entertaining discussions; and sharing ideas, pictures, or experiences.

Development of a Group Poem.--After the topic for a group poem is selected, pupils should discuss the ideas they wish to express poetically. Descriptive words, appropriate to these ideas, may be listed. Synonyms and rhyming words should be suggested and added to the list. As the work progresses, examples of repetitions and written form may be given.

Examples of Original Poems.--Selections by fifth-grade low achievers follow:

Cincinnati Is My Home

Cincinnati is my home,
Where children laugh and play along.
We have a zoo and terminal too
Where people come to greet you.

People come from everywhere,
Just to see Fountain Square.
They throw their pennies
In the pool.
When night come
It's quiet as a rule.
When dawn appears, the children you'll hear,
The rush of cars will soon be near.

A B C's

There were some bees,
Who tried to learn their ABC's
But everytime they passed the A
They forgot the rest to say.
So they tried it once again,
And forgot how to begin.
Then one day one bee said,
"Let's give up,
It's too much to dread."
But one bee said, "Let's try it again."
They didn't stop till they came to the end.

Farming

My father is a farmer,
He loves tall oak trees,
He grows corn and apples,
He even grows peas.

I have a little place,
Although there's not much space,
On my place I have corn too,
Come out and see me,
I'm always inviting you.

Smells and Sounds

I like the smell of a cake,
I like the smell of a chicken,
I like the smell of blackberry pie,
I like the smell of Thanksgiving.

I like the sound of rain falling,
I like the sound of popcorn popping,
I like the sound of money falling,
I like the sound of people calling.

Spelling

Many low achievers are poor spellers because they have neither acquired the skills necessary for learning to spell nor developed an interest in understanding words and their meanings. It is the responsibility of the teacher to stimulate a positive attitude toward spelling. He must help pupils to:

Recognize the letters of the alphabet

Learn the names of vowels and consonants

Be aware that every word contains at least one vowel

Hear parts of words within a word, as: de part ment

Blend sounds into words, as: br-ing, blew

Copy a word accurately

Pronounce accurately the words he uses, as: chimney

Have practice in enunciating letter sounds within words

Have practice in changing sounds into letters and letters into sounds

Look carefully at each word and all its parts

Use the words in sentences.

Low achievers in the fourth grade should be supplied with the third-grade spelling text. Those in the fifth and sixth grades should receive the fourth- and fifth-grade texts, respectively.[2] It does not necessarily follow that all pupils will start at the beginning of the text; rather, their level of achievement should determine the most appropriate starting point.

In addition to texts, pupils should use the Cumulative Spelling Lists to review and relearn, if necessary, words studied in previous years. A more detailed explanation of these lists may be found in the Intermediate Manual, Revised, page 91.

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[2] William Kottmeyer and Others. Basic Spelling Goals 3,4, 5. St. Louis: Webster Publishing Company, 1960.

Guiding Spelling

Children may grow in spelling ability by learning to apply certain generalizations, by using prescribed study steps, by building new words from base words, and by tracing words.

Rules.--Rules, as such, mean little to many low achievers. Basic generalizations, however, which pupils can apply to many words, help build an understanding of spelling patterns. Examples of basic generalizations are:

An abbreviation is always followed by a period: Tues., M.D., Dec.

Plurals of most nouns are formed by adding s to the singular: chair, chairs

The possessive of a singular noun is generally formed by adding an 's

Words which end with a silent e drop the final e when a suffix beginning with a vowel is added: hope, hoping; bake, baked

Words which end with a silent e keep the final e when a suffix which begins with a consonant is added: care, careful; love, lovely; hope, hopeless.

Study Steps.--Pupils may increase their ability to spell new words by being encouraged to follow these study steps:

Look at the word: the teacher should call attention to common elements, such as prefixes, suffixes, phonograms, and compounds.

Listen to the word: the teacher should enunciate clearly and properly.

Say the word: the teacher should be sure that pupils pronounce the word correctly.

Write the word: the teacher should be sure that all words are copied correctly for further study.

Check the copied word: the teacher should encourage pupils to proofread their work.

Use the word in a sentence: the teacher should be sure that pupils interpret the meaning correctly.

Word Building.--Pupils enjoy building words from a base word. A second- or third-grade word list is an easy point of departure. Some children may wish to make a chart of words which have been built from base words.

Base Word	s	ing	ed	er
help	helps	helping	helped	helper

Word Tracing.--Tracing words is helpful for some children who have spelling difficulties. Tracing helps them learn to spell the word and to form their letters correctly. The teacher writes the word on a card or strip of paper in large, legible writing. The child uses two fingers and traces the word several times. When he thinks he can write the word correctly, he covers the word and tries to write it on extra paper (or on the chalkboard). He compares his writing with the word card. If it is correct, he files the card in his box. This method should be used only with those pupils who have severe spelling disabilities.

Using Spelling Games

From the section which follows, the teacher may wish to choose games or devices that build interest or insight for words and the letters which form them.

Variation of Word Lotto:

The lotto card and the directions for playing are included below:

d	b	o(wl)	i
l(ady)	l	m(ouse)	s
h	d	b(ody)	h

dead
owl
ill
laid
body
mouse
squirrel
heart
bottle
lady
doctor
hello

The players make their own lotto cards. Spelling words for the day or week are used. Each child places the first letter of each spelling word in a square, according to his own arrangement. As a word is called, every pupil writes the word in the appropriate space. The first child to complete a line calls, "Lotto." The game proceeds until all words from the list have been used. Words are spelled aloud, and pupils check their cards for correct spelling.

Spelling Rhymes:

Children use spelling words to write rhymes.

Example: When the sun shines bright,
Then it is light.

Memory Game:

A number of selected picture cards are shown to the pupils. Cards should carry the picture of one item only. The cards are then removed, and children are asked to write the names of all the objects they remember.

Listening Game:

Three words from current spelling lists are read, and the child is asked to write them. The number of words is increased gradually.

Dictionary Game:

One child opens the dictionary to a page. He indicates that he has opened the book to the tr page. Each child then writes as many words beginning with tr as he can. This game may be played by using teams of three to five children.

Making Words:

A group of words is listed on the board. Each child sees how many new words he can make, by adding beginnings and endings. The affixes, er, est, ed, ing, pre, and im may be used.

Guess My Word:

Each child thinks of a word. A child goes to the front of the room. Each pupil may ask a question about the word. Typical questions might be:

Does the word begin with a cl sound?
Does the word tell us something which keeps time?
Does the word rhyme with rock?

Alphabet Game:

Six to eight children are given cards on which are written words from the spelling lesson. These children go to the front of the room, each holding a card bearing a given word. After the members of the class have had an opportunity to look at the words, the cards are reversed so that the blank side shows. Children at their places write the words in alphabetical order.

What's My Name?

Have a child give the definition of one of the words in the current spelling list. Then have him call on another child to give the word and spell it correctly. The pupil who gives a correct answer then gives a definition for another word.

An animal raised for wool -	sheep
A way of sending and receiving messages -	radio

Word Puzzle:

Begin with the word, DAY. Put the letters p, m, s, l, or w in place of the d in day to make a word that will fit into each sentence. Each word will end in ay.

	D	A	Y	
Mother said that I				go.
Did you				for the clay?
Did he				yes?
Hens				eggs.
Hey! They went that				____

Write with a capital letter one of the words that you used in the puzzle. This spells the name of a month.

How Many Words Can You Make?

Give pupils a list of small words, such as those listed below. Ask children to write as many words as possible which end with the small word. Each word written by pupils should rhyme with one of the small words in the list.

it
at
old
all
ill
and
an
end

Example: all - call tall small
it - _____ _____ _____

Naming Words in a Picture:

Use a cover from a magazine, such as the Saturday Evening Post, or a picture containing many objects. Ask children to write the names of the objects that they see in the picture.

Anagrams:

Forming anagrams offers a challenge to pupils who finish their work ahead of the others. To make an anagram, the letters in a word or phrase are rearranged to form new words:

Rage is an anagram for gear.
Resist is an anagram for sister.
Brain teaser may be rearranged to spell bat in eraser.

A Baseball Spelling Game:

For a review in spelling, divide the class into two teams: the Home Team and the Visitors. Appoint a scorekeeper to keep track of the strikeouts and runs. Designate the corner of the room near the chalkboard as home base. Counter-clockwise from home base, assign first, second, and third bases to the remaining three corners.

The Visitors have the first turn at bat. When the first batter steps to the chalkboard, the teacher pronounces a word from the review list. The batter pronounces the word aloud and writes it on the chalkboard. If he does both correctly, the batter makes a hit and goes to first base. If he either mispronounces or misspells the word, the batter is called "Out" by the teacher. He takes his seat, and the next batter goes to the board. Whenever a batter gets a hit, the base runners advance to the next base.

The Visitors continue at bat until three pupils are out. Then they sit down, and the Home Team comes to bat. To end the game fairly, allow each team the same number of times at bat.

Crossword Puzzles:

Acquaint pupils with the way of solving crossword puzzles by drawing one on the chalkboard and working through it with the class.

Make a blank copy of the puzzle on the chalkboard, and ask pupils to copy it on paper. Write the clues to the puzzle on the board. Pupils may work individually or in teams. As they become more experienced, pupils will need less help from the teacher and will be able to work with a greater number of items. Some pupils may want to try to make their own crossword puzzles. A simplified form with words spelled only horizontally or vertically may be used at first.

Definitions:

Divide the class into two teams. Give each team a suitable number of words from a spelling list to define. The teams prepare their definitions in writing, within a limited time. Team 1 reads its definitions aloud. It scores a point for each definition which is clear enough for Team 2 to recognize the word that is being defined. Then, Team 2 reads its definitions to Team 1. The team scoring the larger number of points wins.

Living Words:

Prepare two sets of alphabet cards. Use one as a working set, and keep the other in reserve.

Give a card to each child in a group. Then pronounce a word from the spelling lesson. The children holding the right letters take their cards, step quietly to the front of the class, and arrange themselves in the order that spells the word correctly.

Before game time, however, the teacher needs to scan the spelling list for words containing double letters, such as kitten, and needs to assign doubles from the reserve alphabet cards. If there are more than twenty-six children in the class, the double letters should be given to the extras. If there are fewer, the teacher should not distribute the less frequently used letters. If there are only eight or ten children, for example, each speller is given two or more letters. If one child is holding two letters which are used out of sequence in a single word, he can loan one of his letters to a pupil holding an ajacent letter in the word. The pupil holds his own card as well as the additional one.

A Word Activity:

This activity involves finding words that are hidden in longer words. Select a long word or name like Washington. Using the letters of the word only once, the children make as many words of three or more letters as they can: Washington - anoint, ant, ash, gain, gait, gash.

Developing Dictionary Skills

The habit of using the dictionary to check the spelling of words is an essential one to develop. However, pupils must learn dictionary skills before they can use this spelling aid independently. Before using a dictionary, the pupil should know:

The order of the alphabet

The letters which are located in the first, middle, and last parts of the alphabet

The technique for arranging alphabetically words which start with the same letter

The kinds of information contained in a dictionary.

Introducing the Dictionary.--The teacher needs to help pupils understand the value of the dictionary, both as a check for spelling and pronunciation and as a source for learning the meanings of words. In introducing the dictionary, the teacher should call attention to the general format and the terms *entry word*, *guide words*, *pronunciation key*.

Developing Skills.--There are many activities and exercises that help pupils develop skill in dictionary usage. Some of them are suggested below:

Tell pupils to put letters in alphabetical sequence. Have them write in the missing letters.

a _ c d _ _ _ h i _ k _ m _ o p _ _ s _ u _ _ x _ z

Write a series of letters such as *j*, *g*, *e*, *c*, *w*. Ask pupils to name the letter preceding and the one that follows each letter listed.

Have pupils alphabetize words. This exercise may be either charted or duplicated and used as individual work sheets.

Write in each box the correct word from the lists below.		
First Part	Middle Part	Last Part
a b c d e f g h i	j k l m n o p q r	s t u v w x y z

country
flag
salute
respects
blue
America
high
united
gliders

waves
you
me
pride
thrill
do
listen
every
very

ground
I
kinds
mark
question
X-ray
zebra
jump

Number these words in alphabetical order.

_____Dan
_____gas
_____thin
_____aboard
_____rented
_____west
_____shirt
_____chain
_____very

_____mad
_____country
_____lips
_____jaws
_____flock
_____bacon
_____zoo
_____wire
_____open
_____you

_____peppers
_____queer
_____eat
_____house
_____funny
_____X-ray
_____imagine
_____kitten
_____new
_____use

Develop meaning exercises for children to use in groups. Write a sentence on the board, and draw a line under the word to be looked up. Let pupils discuss the part of the dictionary in which the word will be found. After the children look up the word, they decide together which meaning is appropriate for the sentence.

Have pupils alphabetize words, such as dog, bear, trip, rush, water, mouse, according to first letter.

Ask pupils to list a word for every letter in the alphabet. Have one pupil pick out and pronounce a word that begins with a, another with b, and so on, until a word has been supplied for every letter of the alphabet.

Assign pupils to select the meaning of a word from two or more phrases. For example: What does suddenly mean? at least all at once

Have pupils look at a word having two definitions. Ask them to use the word in sentences to illustrate both definitions.

Have pupils make a word file. A large box with cardboard dividers is useful for filing special words that a child has looked up in the dictionary. This is an opportunity to show how to alphabetize words beginning with the same letter. A sample card is shown.

banana
ba nan a
Bananas are yellow.

Ask pupils to keep an individual dictionary or word book. Children may make a booklet or use a notebook for developing a personal dictionary. The sheets should be labeled with the letters of the alphabet.

Develop exercises for alphabetizing by the first two letters. After mastering this skill, let pupils practice alphabetizing by the third and fourth letters.

Provide occasions for using guide words. From a list of words, ask pupils to select the guide words between which a specific word is found.

Encourage pupils to find meanings independently. After much group practice, provide occasions for children to look up words independently. A word is presented in context by the teacher. Each child tries to see how quickly he can find the word and decide which meaning is appropriate.

Divide the class into teams for dictionary speed contests. Have the children determine the letters that are in the first, middle, and last part of the alphabet to increase their speed in finding words.

Ask pupils to examine a pronunciation key. Let them practice using the diacritical marks presented in the key. Have the children pronounce the words.

Handwriting

Handwriting is a skill that many low achievers can learn to do well. The purposes of handwriting instruction for the low achiever are the same as those listed in the Intermediate Manual, Revised, page 94. It is essential that the teacher consider these purposes in planning the instructional program.

For low achievers, legibility should be the major goal, and desire for improvement should be fostered. Legible handwriting is an important aspect of all acceptable written work. The teacher's responsibility is to provide regular, guided instruction to help pupils achieve this goal.

Instructional Principles

Some children enter the intermediate grades without having successfully made the transition from manuscript to cursive writing. These children probably lacked the maturity and co-ordination necessary for cursive writing at the time that it was introduced in the primary grades. Others mix cursive and manuscript writing within the same word or sentence. With such children, the teacher begins at the child's stage of transition and guides him into the use of cursive writing.

For children who are just beginning cursive writing and for those who need help in improving the legibility of their writing, the teacher should:

Display good examples of cursive writing

Use the compendium and the permanent wall cards

Make use of the chalkboard in demonstrating correct letter formation

Emphasize the use of simplified letter forms, free from flourishes and extra strokes

Demonstrate that the paper is tilted in a slanted position, so that the lower left-hand corner points to the middle of the body

Demonstrate that a word is written in a continuous movement with letters connected

Demonstrate that an i is dotted and a t is crossed after the word is completed

Have pupils compare their writing with the standard writing scale.

Guides for Self-Analysis

Pupils should be guided into analyzing their individual handwriting progress. The following points of emphasis, having been developed co-operatively by teacher and pupil, may be included on a chart or check list. These points may suggest others to the teacher and the children.

Are the beginning strokes slanted upward?

Are the tall small letters as tall as capital letters?

Are the loops of h, b, l, and k open?

Do the r and s have pointed tops?

Are the humps of the m and n rounded?

Do capitals G, J, S, and I start at the baseline?

Do the capitals N, M, H, K, U, V, W, X, and Y start with "walking canes"?

Are the letters s and o closed?

Are the down strokes of d and t straight and closed?

Examples of Units

To show how language can become an important part of unit development in a class, two units are briefly described.

Living in a Changing Community

Visits of foreign students and teachers to one school inspired the pupils in a classroom to talk about persons living in the school community. As the teacher and class became increasingly aware of the cross section of peoples living in their community, they developed the idea of a related unit.

Living in the community were Caucasians, Negroes, and several persons of Asian origin. Also, a number of parents had been with the armed forces in Korea, China, Japan, and Turkey. The information the pupils had regarding the extraction of the people in the community ranged in degree from the easily verifiable, the questionable, the hearsay, to the erroneous. Much was based on impressions, personal contacts with adults, and on Hollywood movies.

Informal class discussions indicated that the children bore sympathy for persons of different racial or ethnic extraction. Animosity was not expressed. Differences in the appearance of the people from different groups and in their ways of living were described in a matter-of-fact manner.

Initiation.--This community situation provided an excellent opportunity for teaching the interrelation of all people. The class decided to bring to the classroom objects relating to China, Korea, Japan, and Formosa. As items were brought into the classroom, opportunities for sharing ideas increased.

The filmstrip, "About People," was used to point up the need for distinguishing between fact and opinion. In a discussion following the showing of the filmstrip, the children recalled ideas they had shared previously regarding people from the Orient. They discussed differences and similarities existing within the class -- needs, desires, and physical characteristics. The group concluded that, although opinions might be helpful and interesting, there was need for accurate information. They made plans for obtaining this information.

Development.--As the unit developed, the following activities were planned and executed.

Questions of special interest were listed.

Ways of finding information were outlined.

Specific differences in information on a given subject were discussed, as books and pictures were used.

Charts, comparing and evaluating sources of information, were made; chart headlines were suggested by the children and the teacher.

Charts, listing helps to judge the reliability of information, were constructed. Examples follow:

Check copyright date of books.
Think of the purpose for which information is designed.
Ask about author and speaker.
Check by asking a person who is likely to know.
Determine, insofar as possible, whether the author or speaker presents facts or opinion.

Finding and Using Information

By	From	Most Up-To-Date	Most Information	Best Liked
Listening carefully	Radio			
Listening and observing	TV			
Skimming, reading, and looking at pictures	Books			
Seeing at firsthand	Trips Visits			
Scanning, clipping, sharing	Newspapers Magazines			
Examining carefully,	Pictures			
Making titles (sentences)	Museum Cases			
Watching carefully & listening - reporting (notes, if desired)	Films			
Preparing good questions, listening, taking notes	Grown-ups - travelers - resource persons - parents, teachers - librarian.			

Outcomes.--As a result of the work done on this unit, the children developed the following concepts:

It is not always easy to tell facts from opinion; things are happening daily to change the ideas that we believe to be facts.

It is important to compare different sources of information on the same topic.

News happenings are interesting and fun to hear and watch.

It is important to think about what is heard and seen.

It is important to notice words that sometimes indicate opinion; seems, think, maybe, perhaps, might, believe.

It is essential to remember some of the exact words when reporting.

The "whys" are important considerations.

A Classroom Newspaper

A classroom newspaper serves as a practical means for the collection and preservation of pupils' writings. Its format can be easily adapted to the ability and achievement of the pupils within a particular classroom. Used as an ongoing activity, the newspaper provides a visible record of the improvement and progress in children's writing.

In one classroom, a bulletin-board newspaper had its beginning as a daily news book. The class entered composite reports on general news of interest in the book. The early composite reports included:

News about the weather; both routine and spectacular items, such as hurricanes and their day-to-day developments

School news

Science news

Cartoons

"Tips"

News of social interest.

Language Activities.--Many language activities made this unit more meaningful:

Records were kept in individual notebooks and included:

- Word lists
- Questions to think about, raised initially and as the unit progressed
- Contributions of people from the Far East
- Clippings
- Drawings
- Notes
- Reports.

Recognition charts for member participation were made.

Filmstrips on Japanese customs were shown and narrated by the librarian.

Research was done for short reports with the assistance of the librarian; complete ideas were expressed in both oral and written reports.

Letters were composed and sent to selected local Japanese-Americans.

Reports on the Japanese, as to their occupations and their citizenship characteristics, were given by the teacher.

Interviews with the Japanese-American guests were conducted by the children.

Plans were made for the visitors; they involved:

- Choosing hostesses
- Discussing good manners
- Planning activities
- Writing a program
- Writing invitations to parents
- Clarifying jobs of class and of discussion leader. (Candidates spoke on why they would make good officers.)

Questions were planned to ask the visitors; they included:

- Thought-provoking questions
- Questions that could be answered by the visitors
- Questions for which answers were not already known
- Questions that were of the "opinion-type."

A Junior Explorer's Club was formed for "carry-over" during the summer.

Development.--In addition to compiling items for the daily news book, the class was encouraged to listen to news programs on the radio and to read a daily newspaper. Listening to television news commentators and to programs of special interest was also encouraged.

Parents co-operated by taking their children on excursions for the purpose of increasing their background of knowledge. One girl visited a newspaper building, the Post-Times Star, with her father. Her report to the class prompted interest in a class newspaper, which could be shared with other children in the school. The class decided to prepare a newspaper for the lunchroom bulletin board. Pupils chose to report on news of lasting interest. Many of the reports were the outgrowth of excursions which children took with their parents to class-suggested places. Reporters and editors were then selected.

The editors were held responsible for checking reports for errors, helping reporters think of ideas for news items, suggesting places to go for interviews, and meeting with reporters after they had made visits.

The class worked together to compile suggestions for general news items. A typical list of suggestions follows:

Weather News

Tips for Cold Weather

If Our Earth Were Not a Magnet

Kinds of Magnets

Rocket News

Cornerstone-Laying Ceremony for West End Y.W.C.A.

Fun in Cincinnati

Important Places in Cincinnati

School Clubs (After-School Programs)

Exploring Cincinnati:

Ride with no specific destination - observe and report interesting sights.

Ride or walk with a specific destination in mind, and report.

Outcomes.--Appropriate standards for writing individual reports were developed. These included:

Writing interesting and correct sentences

Observing the rules for capitalization and punctuation

Copying the report in legible handwriting

Planning illustrations for the article, with the reporter either making the illustrations or conveying to the classroom artist his ideas.

Language Activities.--This newspaper experience provided many opportunities for language activities, such as:

Composite reporting, oral and written

Individual reporting, oral and written

Using the correct form in writing: punctuation, capitalization, spelling

Interviewing

Listening

Evaluating.

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CHAPTER 4. SOCIAL STUDIES

An Appropriate Social Studies Program

In planning an effective social studies program for low achievers, the teacher needs to assess her pupils in two important areas: the level of achievement which they have reached and the background of experiences which they have acquired. Their lower level of academic achievement may be related to lower intellectual capacity, an inability to use necessary skills in reading and in written and oral expression, or a deep-seated conviction of failure resulting from an accumulation of experiences of inadequacy or frustration. The home and community backgrounds of many of these children have often provided little opportunity for basic developmental experiences necessary for building understandings and knowledge in social studies. In many cases, enriching activities must be planned to overcome the disadvantage faced by pupils with a meager background of experience.

The purpose of this section is to suggest ways that the teacher may help the low achiever to achieve in social studies. The creative teacher will not only adapt the activities suggested in this manual to his pupils' interests and needs but will also think of many other activities which will contribute to growth in understandings, attitudes, and skills.

Goals

The major goals of the social studies program for low achievers are the same as those for all children and are stated in the Intermediate Manual, Revised, pages 102-105. It is especially important that these children have constant guidance from the teacher in the achievement of the goals since many lack the insight and the experiences necessary to establish for themselves adequate goals of democratic citizenship.

Needs of the Low Achiever

Certain needs must be considered when planning a program for the low achiever. While these needs are common to all children, the urgency of the need often is greater for the low achiever who is handicapped by an accumulation of incompleted phases of growth and development and by academic failures.

Achievement.--The teacher must employ knowledge, skill, and patience in helping each child achieve optimal learning in social studies. Constantly he must remind himself that low achievers can and do learn, although not at the same rate nor, perhaps, in the same way as do able children.

Low achievers can learn, but need numerous occasions and well-planned procedures to acquire skill in the use of problem-solving techniques. The problem under consideration should be simple and clearly defined, and the steps used to reach a solution should be clearly understood by all pupils. Low achievers may not reach the same degree of skill in using problem-solving techniques as do more able children; however, ability to use the techniques is equally important to them as individuals and as members of a democratic society. Help in learning to work independently, to evaluate the results of his independent activities, and to plan ahead in light of this evaluation is essential to continued growth.

Citizenship.--The low achiever needs direction in earning an important place in his school and in his social group. Participation in activities that develop a feeling of belonging, a sense of security, and a feeling of adequacy should be stressed. Simple responsibilities for which he has the sole authority should be provided so that he realizes his personal worth and receives recognition from his peers. Examples of responsibilities that could be assumed are: sign maker, hall guard, Red Cross membership chairman, or playground leader for small children.

Every member in our society must learn to assume responsibility for himself and the larger group of which he is a part. Through group work in social studies, the slow child may learn that the greatest success is achieved when each individual makes his maximum contribution to group goals, and that he has a responsibility to contribute in relation to his ability.

A respect for and a general familiarity with vocations to which he may realistically aspire should be developed by the slower learner through the study of the way people live. This can be accomplished effectively through the study of the community and of the importance of each person's contribution to the growth of the community.

The low achiever also must acquire an understanding of and appreciation of our American heritage. While several subject matter areas, as well as television and the news media, contribute to these understandings, the major emphasis is in the social studies.

Working with Low Achievers in Social Studies

General Approaches

Early identification of problems encountered in working with low achievers will enable the teacher to plan the social studies program more effectively and to use scheduled time more wisely. The realization that each individual is unique will enable a teacher to set and accept reasonable standards of achievement without feeling guilty about sacrificing grade standards. This knowledge, combined with understanding and insight, will assist the teacher in helping each child achieve optimal learning.

The teacher must accept the fact that the slower learner can develop intellectually. The successful teacher will try many methods of working with him and will employ the ones which are the most effective. Suggested general methods for helping the child grow intellectually follow:

Guide the learner into planning work in which he can meet success.

Help him to recognize and develop his strengths and to analyze and overcome his weaknesses.

Develop social studies units around the interests of the pupils.

Set up specific routines for many activities; i.e., planning the day's work, getting materials, caring for books and materials, arranging working groups, and evaluating work.

Give specific directions. Be sure that each child understands them.

Train the pupil to assist in classroom organization and to assume his share of responsibility for its operation. This is an important part of the social studies program for it will prepare him for adult life.

Develop research skills slowly and thoroughly.

Develop the skills necessary for group work before organizing the entire class into working committees.

Encourage each pupil in every way possible. His enjoyment of school may be greatly strengthened if he becomes a specialist in an area of interest in social studies. Encourage him to develop this interest as a long-range project during his spare time and to share it eventually with his classmates.

Development of Background Experiences

The low achiever often lacks experience in areas which would give him background for social studies work. Limited backgrounds, rather than low mental ability, are sometimes the cause of failure or poor work. The teacher must devise a variety of ways other than independent reading to provide developmental experiences. There are many resources which, if skillfully used, will give the low achiever desirable background and will make the text more understandable. A few resources for building background are listed below. The techniques involved in the use of each are explained.

Pictures and Maps

Have available a file of pictures which portray important facts for a unit. Pictures which build understandings for each unit should be filed in a separate, orderly fashion to make them easily accessible when needed. A discussion of selected pictures should lead to basic understandings of the section of the world under consideration and to acquisition of pertinent vocabulary which should be recorded where pupils can refer to it. The pictures should be posted in the classroom where children can examine them further. A similar procedure of examination and discussion of maps and pictures in books is effective.

Library and Supplementary Books

Especially informative, interesting, and well-written library books, read to the class by the teacher, will yield further information and will introduce additional vocabulary to be learned and recorded. As many simple books which children can read for themselves as can be located should be provided. The social studies section of the Supplementary Book List gives the titles and reading levels of books which are appropriate for low achievers to use.

Films

One of the best ways of building background information for a unit is through the use of films on the recommended list from the Visual Aids Exchange. The teacher should be familiar with the film before showing it and should establish with the boys and girls purposes for viewing each film. A follow-up period of guided discussion should provide occasions for pupils to talk over new concepts presented, to relate ideas in the film to information already learned, and to raise new questions for investigation based on the film.

Exhibits

For some areas, children will have objects to display, label, and discuss with the class. Display cases from the Museum of Natural History are an important source of information.

Resource Persons

Frequently, a native of the area being studied or a traveler who has visited there will talk with the class, give interesting information, and answer questions. A group of pupils may work together to construct a list of questions to be used in interviewing a visiting resource person.

Excursions

Excursions offer a wonderful opportunity for firsthand experiences. Citizenship attitudes are fostered as children plan purposes for the trip, establish standards for acceptable behavior on buses and in public places, and discuss the wise use of money.

Travel Materials

The teacher should use every opportunity to collect travel materials, materials from children's magazines and newspapers, and pictures which can be organized into booklets to be placed on the library table for browsing purposes. Pupils may be encouraged to collect similar materials and make individual booklets, labeling each picture with appropriate phrases or simple sentences.

Music, Art, Dances

In addition to information, the art, music, poetry, and folk dances of an area should give pupils greater understanding and appreciation of its people. Recordings may be used, and the art and music teachers may provide experiences related to the unit.

The Use of Textual Materials

One of the major problems encountered by the low achiever in social studies is an inability to read textual materials. Several factors may be contributing to this difficulty. He may not have acquired a sufficient sight vocabulary or the skills necessary to study and comprehend a content subject. He may not have the background experiences necessary to understand the many social studies concepts.

Many low achievers, whose reading level frequently is two years below their grade placement, cannot read the textbooks normally provided for the grade. However, after acquiring a considerable amount of background information and vocabulary from experiences such as those listed above, most low achievers are ready to use the text as a resource. There are many ways of using the text as a tool. The ways presented here are meant only to be suggestive.

Interpreting Pictures and Maps.--Group work is effective in guiding low achievers to interpret pictures and maps in the textbook. If the text is well illustrated, much can be learned from picture interpretation alone. Questions, motivated by examination of pictures, may form the basis for a simple, directed reading assignment. Low achievers can be taught to read maps effectively enough to gather pertinent geographical information by noting land elevations, by studying relative locations of land and water, and by determining regional locations in relation to the equator and the poles. Simple relationships between geographical factors and patterns of living within an area may be developed in group discussions.

Skimming for Specific Answers.--A definite reading assignment which includes specific questions is more motivating and encouraging to a poor reader than the task of reading an assigned quantity of material for the general information that it may contain. Pupils should be encouraged to use topical headings to locate wanted information. A simple assignment for group work may include a number of questions about a specific topic. At first, each child may be able to answer only one question of the "who," "what," "when," or "where" type. Their answers may be organized and combined into a group report.

Selecting Main Ideas and Details.--Much guidance is needed to help low achievers understand the relative importance of main ideas and supporting details. Any problem under consideration should be very clearly defined. Careful phrasing of questions supplies direction in differentiating between broad ideas and specifics. For example:

> Where do the Congolese find the materials for building their homes? (Main idea)
>
> What materials do they use? (Details)

The organization of answers to related questions into a simple outline helps many pupils see relationships and become more skillful in selecting broad ideas and details.

Concept Formation and Critical Thinking

The low achiever grasps ideas slowly and has limited ability to reason, generalize, see relationships, draw conclusions, and think critically--all required skills in social studies. The teacher will need to provide the opportunity and the challenge for pupils to improve in these abilities. Classroom activities and discussions should be geared toward developing the skills to reach conclusions based on known facts. Simple "why" questions direct the pupils' attention toward finding information which supports or disproves a stated idea.

These pupils are better able to grasp the "here and now" than the "far removed" in time and space. It is easier for them, for example, to evaluate classroom leaders than national or historical figures. They need many first-hand experiences and concrete or visual materials to develop concepts. Whenever possible, learnings gained in the classroom should be related to the personal experiences of pupils.

Propaganda and advertising confuse the low achiever. It is important that the teacher find ways of helping him to become more discerning by pointing out and discussing various techniques commonly used to distort information.

Development of Work-Study Skills

Low achievers have a short attention span and require immediate results. Long-range planning for units, therefore, must be accompanied by thoughtful scheduling of day-by-day work and frequent periods of evaluation. Lessons, which are frequently planned with the pupils and oriented toward goals which are meaningful and attainable to them, are most effective.

Often these children are limited in the kinds and amount of independent work which they can do and may have developed poor work habits. The teacher needs to provide much guidance in developing independent work skills as the units progress.

Research Skills.--Training in the use of research skills will require time and patience. Only after individual pupils show an interest in and ability to do very simple research, should more complex techniques be introduced. Before the pupil has finished the fourth grade, he should learn to locate materials by using a simple table of contents and index. Research skills may be developed when problems of living, such as clothing, homes, or work, are selected for exploration. The teacher should work individually with anyone who needs help in finding pertinent facts or in organizing material. He must help the child to make a simple outline for his report. If the report is to be written and read, the pupil may achieve better organization by writing each main point and its supporting facts on separate pieces of paper.

Although these children need to learn to make oral and written reports, there are many other devices which may be used to impart information. The teacher will be able to appraise growth and achievement if he encourages pupils to report their findings by arranging and labeling a display, building a model, making a diorama, drawing a mural, and the like.

Group Techniques.--An approach to the development of skill in group processes is to work with the total group. The teacher may write one topic at the top of each panel on the chalkboard. After the reference pages have been found and listed under the respective topics, the material may be read co-operatively by the class and teacher. As information is found, sentences may be written on appropriate panels. Later, the information may be combined and put into a permanent record. Committees may be appointed to combine the material and report on each topic.

Correlation with Language Arts

Activities which develop background for social studies may be correlated effectively with language arts. The more ways in which the child uses and records his knowledge and experiences, the greater will be his intellectual development. The teacher should plan many opportunities to correlate language arts skills with social studies learnings.

Vocabulary Development.--Significant words used in a unit should be recorded and defined. The charted list then could be used for:

A picture dictionary

Riddles

Spelling exercises

Picture captions

Alphabetizing exercises

Matching exercises

Vocabulary booklets

An index guide

A card file

Reports

Topical headings in an outline

Written Expression.--Captions may be written by the children for pictures displayed on a bulletin board. These could be kept in an envelope, and poor readers might match them with displayed pictures during free time.

Information and vocabulary gained from any one activity could be the basis for a charted group story. The story should be written in simple sentences. Several of these stories, mounted on an easel or kept together in an easily manipulated position, might be used as a reading lesson for slower children. In formulating the story, the group would gain experience in selecting important facts and in organizing these facts into good sentences and paragraphs. A child might develop the same skills by making an individual booklet with separate pages to report each activity. Very slow children might be expected to write only one sentence while more able children might write a paragraph of several sentences.

Oral Expression.--After viewing a film, children might engage in a panel discussion about the facts learned. This activity should be carefully planned so that the participants and listeners will feel secure.

Many less able pupils are challenged by an opportunity to participate in creative dramatics. This activity might be an outgrowth of a film, a story, or a poem.

The class may incorporate important social studies facts into simple stories which might later be used for choral readings. The children not only will enjoy speaking lines that they have helped to compose but also may learn and understand the facts that otherwise might prove difficult for them.

Materials

Suggested social studies materials that are useful in working with low achievers are listed below:

Maps, globes, atlases

Supplementary books

Catalog from Visual Aids Exchange and Museum of Natural History

Extensive picture file for all area units

Actual objects from an area

File of newspaper and magazine articles that relate to area units

Art, construction, and sewing materials

Materials for making charts

Easy library books about area units

Evaluation

Self-appraisal is important to the growth and development of the low achiever. Criteria for evaluation must be definite and must measure growth toward established standards of content learnings, attitudes, and study skills. Each pupil must understand the criteria and be guided to use them to make a realistic evaluation of his strengths and weaknesses. Through conferences with the teacher, he should receive help in formulating a plan for improvement in needed areas. Some provision should be made for the pupil to see concrete evidence of improvement that has been achieved. A comparison of later work with earlier efforts helps to build confidence and to motivate a greater desire for improvement.

Evaluation is a continuous process in which both the teacher and pupils consider the developmental and learning processes upon which the group has been working. This type of evaluation requires a co-operative analysis of each child's progress in relation to his:

Concept mastery

Vocabulary development

Work habits

Oral contribution

Written responses

Reading interests

Growth in desirable character and citizenship traits

Art activities.

A check list is one helpful way of making such an appraisal. A sample of this device follows.

SOCIAL STUDIES CHECK LIST AND EVALUATION CHART

Name____________________ Age_____ Grade_____ Teacher____________________

Skills	Unit I Date		Comment	Unit II Date		Comment
	Yes	No		Yes	No	
Research Skills						
Knows alphabet						
Can use dictionary						
Uses table of contents						
Uses index						
Can skim for information						
Can select information on single topic						
Can read and understand simple maps, charts, and graphs						
Social Skills						
Works well in groups of two or more						
Shares with members						
Can take directions as a member of a group						
Can give instruction as leader						
Knows election procedures						
Understands majority rule						
Does not waste time						
Shares with other groups						
Can take constructive criticism and use it to improve						
Has learned to choose leaders wisely						

Skills	Unit I Date		Comment	Unit II Date		Comment
	Yes	No		Yes	No	
Related Language Arts Skills						
Can read text						
Can recognize important ideas						
Can summarize material in own words						
Can give report in front of class						
Can answer questions on report						
Can write report in pencil, in ink						
Can write a good paragraph						
General						
Can transfer information from						
a. one medium to another						
b. one subject to another						
Asks intelligent questions						
Sees there is more to learn						
Does						
less than asked						
more than asked						
as much as asked						
Grade on Report?						
Grade on Test?						
Grade on Report Card?						

Objective Tests.--An objective test must use vocabulary within the child's comprehension in order to measure social studies learnings rather than reading ability. Test questions should be designed to measure comprehension of ideas rather than retention of isolated facts. Types of exercises which may be used in an objective test follow:

Match vocabulary and definitions.

Match pictures and verbal descriptions.

Fill in the blanks of an imaginary letter written by a tourist. In the completed sample below, the underlined words would have been listed at the end of the letter:

Dear Jack,

I am having fun living in a chalet, which is a Swiss house. The mountains here are called the Alps. The highest mountain is Mont Blanc. Lake Geneva is beautiful. There are a great many other travelers, or tourists, here. Josef is the boy I am visiting.

Yesterday I went up a mountain with Josef to see the men who take care of the cows. They are called herders. There are many cows in Switzerland. The Swiss people make very good cheese and milk chocolate from milk.

We saw rivers of snow and ice called glaciers. We watched the mountain climbers. They carry sticks called alpenstocks. All around us in the mountain meadows the hay was drying in the sun. It was exciting!

Tomorrow I am going to buy a wood carving. I want one of Switzerland's hero, William Tell. I would like one of a St. Bernard dog, too. Josef's mother is going to help me buy two Swiss products, a watch and some pretty handkerchiefs for my mother. I will try to find a gift for you.

I will see you in a few weeks. I certainly will have many exciting stories to tell you.

Your good friend,
George

Arrange sentences about an area activity in correct sequence as:

1 The Eskimo sees a whale.

4 The Eskimo pulls the whale to shore.

2 The Eskimo paddles in a kayak to the whale.

3 The Eskimo harpoons the whale.

Work a crossword puzzle.

```
              (1)

      1. E S K I M O
               G
        (2)    L
         C     O
    2. H A R P O O N
         C
         H
         E
```

DOWN	ACROSS
1. An ice house of the Eskimo	1. An eater of raw meat
2. A refrigerator of the Eskimo	2. Weapon to kill whales

Verbal Tests.--Verbal tests are especially effective in measuring the knowledge of low achievers. Picture interpretation reveals understandings of concepts and changes in attitudes. Test questions which have been individually designed by the pupils or co-operatively designed by teacher and pupils may be read to the children and answered orally.

Sample questions for a quiz contest are listed below:

Quiz Contest

Procedure

Committee of strongest students prepares questions and acts as quiz masters.

Committee decides on prescribed number of points for correct answers.

Class divides into 2 teams and competes for high score.

Individual team members compete for high score.

Sample Questions Asked

Tell me which of the following things are exported by the Mexicans: Pottery, Jewelry, Elephants, Leather Goods, Palm Kernels.

Tell me in which of these ways Mexican life has changed: Fiesta, Education, Siesta, Transportation, Communication.

Which of the following articles of clothing are worn in Mexico but not in Cincinnati: Serape, Slacks, Reboza, Mantilla, Skirt, Sombrero?

Organization of the Program

Citizenship Emphasis

An orientation unit on citizenship provides many opportunities to help children develop better self-concepts. Such a unit also helps children establish guidelines for acceptable behavior and personal responsibility to the group. Through the activities outlined in the citizenship unit developed later in this section, children can be guided to:

Plan together effectively

Obtain satisfaction from accepting the responsibility of being both a leader and a follower

Act with freedom and, at the same time, respect the rights of others

Use self-control

Recognize the importance of interdependence in problem-solving situations

Understand individual weaknesses and appreciate individual strengths.

Although this unit will be carried on during the first few weeks, its long-term outcomes will be reflected throughout the year in classroom procedures, in pupil behavior, and in the development of regional units.

Units for Pre-Fourth Grade

Some very slow classes are organized with the understanding that most of the pupils probably will spend four years in the intermediate grades. In such cases, it is advantageous to plan, for the year immediately following the primary grades, social studies content which is entirely different from the regular intermediate program. Following a specially planned curriculum during the extra year, rather than repeating units of a given grade, promotes interest and gives children a broader learning experience. Preferably, the extra year should come before the regular fourth grade, should serve as a transition between primary and intermediate grades, and should include activities of increasing difficulty.

Community Units.--There are many possibilities for programming in social studies which will smooth the transition from the family, home, and community studies of the primary grades to the broader program at the intermediate level. One of the most promising of these is a community study which begins with the immediate environment of the pupil but opens far-reaching avenues to introduce the child to the city, state, nation, or the world about which he will study in the fourth, fifth, or sixth grades. Many opportunities for such a study exists in each community. A brief report of a community unit appears later in this section. It is hoped that this example will suggest other units which will use the immediate community as a starting point and will lead to broader understandings.

Area Units.--If area units are to be used with pre-fourth-grade classes, it is desirable to develop the alternate units listed in the Intermediate Manual, Revised, page 117. For example:

Living in a Mountainous Region: Norway

Living in a Hot, Wet Region: Amazon Valley.

Area Units for Grades Four, Five, and Six

While it is difficult for low achievers to learn complex historical and geographical concepts, it is important that they work with simple, activity-filled units on sections of the United States and on areas outside of our nation. Through such a study, they will begin to understand and appreciate national and world affairs. Interest can be generated by the appeal of strange and exciting places. In addition, many factors in our present-day life, such as television, jet planes, and increased travel, have tended to make these places closer and more familiar to all children. The number of area units covered will depend on the ability and interest of the class.

In this bulletin, illustrative area units for the fourth grade have been outlined in considerable detail. Similar activities and emphases may be adapted by fifth- and sixth-grade teachers in developing their program.

Units for Fourth Grade.--If a child is to spend only one year in the fourth grade, it is important that he have a basic social studies foundation that is gained through the area studies offered in the regular fourth-grade curriculum. It is recommended that the low achiever work with the following areas:

Living in a Mountainous Region: Switzerland

Living in a Polar Region: The Far North

Living in a Hot, Wet Region: The Congo

Living in a Land of Great Variety: Mexico

These units are outlined in detail later in this section.

Units for Fifth Grade.--The units developed at this level should be an adaptation of the regular fifth-grade social studies curriculum. Possibilities for simplified units based on the life and people in the United States are:

Biographical Studies of Famous Americans

Ways of Living in the United States, Now and Then

  Living in an Early Northeastern Settlement

  Pioneering in the Midwest

  Life on a Southern Plantation

  Ranching in the West

Contrasting Community Life Today

  Fishing
  Farming
  Manufacturing
  Mining
  Ranching

Living in Contrasting Regions in the United States

  Mountains
  Deserts
  Swamps
  Plains
  Plateaus

Units for Sixth Grade.--Low achievers in the sixth grade may study some of the units of the basic social studies program listed for all pupils in the Intermediate Manual, Revised, page 148. Current news happenings or pupils' interests may guide the selection of a particular area for study. For example, a reference to the Aswan Dam may lead pupils into a study of how Egyptians solved problems of desert living in the past, and in what ways they are solving the same problems today. Emphases developed during the study of selected countries should revolve around the major contributions that the people in these countries have made to the traditions, culture, and institutions that we in the United States enjoy today. Attention should be given to the present way of living in these countries and the interdependent relationship between them and our own nation. Simplified units on the following areas are appropriate for low achievers in the sixth grade:

Living in the Middle East: Egypt

Living in a Mediterranean Land: Greece, Rome

Living in a Country in Central Europe: France or Germany

Living in the British Isles.

Many low achievers in the sixth grade are overage and have interests similar to those of junior high school pupils. Such children may well profit by studying a series of units more closely related to their immediate concerns and problems of community living. Possible units which would help them examine and analyze topics of personal interest are:

The Work People Do
- In Our City
- In Our Country
- In the World

Pupils gain a respect for work when they study about the different types of services and skills that are needed to maintain community life. Some classes may wish to carry on a detailed study of what kinds of tasks are involved in particular types of work; e.g., farming or merchandising. Another emphasis might involve a contrast of former methods and present technological improvements used within a given type of work. Still another point of view might focus attention on workers through the ages. An idea of the importance of work to the individual and to the community helps foster desirable attitudes toward each worker's contribution to his community.

Wise Use of Money
- Food
- Clothing
- Recreation

Many low achievers have opportunities for making money by helping in the neighborhood or holding part-time jobs. They need guidance in learning to make purchases that will give the most value for the money spent. The claims of advertising should be explored to enable these children to determine whether or in what ways one product may be superior to a similar one. A study might be made of less expensive foods which contain high nutritional value. A simple analysis of sale prices and the quality of sale products might be included. A survey of community recreational resources may open new vistas of interest and participation in worth-while, low-cost activities. Through a directed emphasis upon the quality and value of purchases, these boys and girls begin to develop more thoughtful standards for the expenditure of their money.

Conservation

Clothing, Foods, Home
Public Property
Personal Possessions and Materials

Many pupils need guidance in the care and proper use of school supplies and other possessions. Classroom attention should be focused on the responsibility of each person, toward keeping his surroundings neat and orderly, both at home and at school. An understanding of the economic advantages of taking care of possessions should be developed side by side with an appreciation of the resulting pleasing appearance and increased utility of things which are kept in good repair. Attitudes and practices of good citizenship are fostered when boys and girls develop their own standards for the acceptable use of public property.

Wise Use of Leisure Time

Many low achievers lack skills or motivation for using leisure time constructively. For example, reading may be more of a chore than a source of enjoyment; opportunities for hobby development may be limited by lack of money, interest, or skill. Classroom attention may pinpoint the importance of learning to participate in games and sports, of expressing oneself creatively, of developing an enjoyable hobby. Demonstration of hobbies, exhibits of leisure accomplishments, study of community resources all emphasize the possibilities and rewards of a satisfying use of free time.

Transportation Through the Ages

The extra curricular drawings of jet planes and rockets which decorate many pupils' papers indicate a strong interest in current developments in transportation. Significant changes in living, made possible by improvements in transportation, touch many aspects of the personal lives of today's pupils. An understanding of the effect of rapid transportation upon the growing interdependence of the world community of nations encourages pupils to look beyond their immediate surroundings and to become aware of the commercial products of other countries. In this manner, a basic unit on transportation may motivate a series of brief studies of various, selected countries.

Illustrative Citizenship Unit: Grades Four - Six

Many low achievers, because of failures and frustrations, have accumulated feelings of inadequacy and insecurity. It is especially important, therefore, that the teacher spend the first few weeks laying the foundation for the development of secure, adequate individuals. Only as the child's concept of his personal worth is strengthened and expanded can his learning power increase.

A citizenship unit, initiated and developed at the beginning of the school year, helps each pupil to become identified with the class group and to work with others to further group progress. It is important to continue citizenship activities and learnings throughout the year.

Initiation

Motivation for this unit may begin the first day that the class assembles. Attractively written name cards, cleverly planned introductions, and mixers that involve partner and group situations are suggested techniques both for developing rapport and for creating a sense of satisfaction in being an active participant in the opening day plans.

Development

Outlined below are activities with accompanying teaching emphases which are directed toward attaining Goals 1, 2, 7, and 8 as listed in the Intermediate Manual, Revised, pages 102-105. It is hoped that these suggestions will call to mind additional ways of achieving other goals that have citizenship implications.

Activity	Emphasis
Discuss and list ideas for: Making the room more attractive Becoming better acquainted Making the class a more interesting daily experience.	Importance of expressing one's opinions clearly, thoughtfully, and correctly Importance of respecting the opinions of others
Divide into smaller groups for evaluating ideas listed above. Select a chairman and secretary for each group. Demonstrate with one group to show the role of chairman, secretary, and group members.	Effectiveness of small group discussions with total group sharing in problem-solving situations The important part that every group member plays in the efficient development of projects
Listen to reports from small discussion groups, and revise listed ideas.	Necessity of setting up and abiding by standards for listening, reporting, and evaluating
Vote on ideas that are to be developed immediately.	Responsibility involved in voting and in abiding by the rule of the majority
Organize class into committees to begin plans for carrying out the selected ideas--such as seasonal room decorations, a class birthday book, an attendance and seating chart, bulletin board captions, and the like.	Importance of working harmoniously with others in carrying out joint responsibility Practice in the skills required for effective group work
Organize a campaign for the election of officers for a room club. Plan to have the campaign coincide with and follow the pattern of a political campaign.	Emphasis on the privilege and responsibility of freely selecting and supporting qualified persons for office Development of standards for constructive leadership

Activity	Emphasis
Write club motto, pledge, and purpose as a group project or as a competitive individual project.	Importance of communicating ideas in writing so that they are meaningful, legible, and original
After a group discussion, write simple sentences explaining the significant words and phrases in the Pledge of Allegiance. Using these interpretative sentences as a theme, plan creative dramatizations and illustrations.	The realization that the Pledge can be recited intelligently only if its meaning and significance are understood
Plan daily opening exercises around the above illustrations and dramatized interpretations.	The realization that personal daily experiences make the Pledge more meaningful
Discuss and list, when the need arises, good citizenship qualities or rules of conduct needed to get along with others.	Importance of participation in the analysis and establishment of standards of behavior
Copy and illustrate acceptable conduct rules or citizenship qualities in individual booklets.	Importance of copying materials accurately and neatly
Select, according to agreed standards, drawings from preceding activity to be enlarged and displayed.	Importance of setting up criteria upon which selections may be made
Have each child work independently in creatively developing and presenting one behavior quality or rule and act as its sole interpreter.	The importance of individual responsibility in interpreting and setting an example for a conduct pattern
Form teams to compete in carrying out the behavior rules after class cohesiveness has been established.	Significance of team work in developing fair play, sportsmanship, and a oneness of purpose
Take inventory of classroom supplies and books using index cards for recording each item.	Development of a sense of responsibility for systematically accounting for and conserving property
Organize a classroom library with an appropriate staff and accepted library procedures. A visit to a library will serve as motivation for this project and will give the necessary background for planning details.	Realization that success of community services depends upon careful use of equipment, strict adherence to regulation, and respectful co-operation with those in authority Realization that reading can be fun

Activity	Emphasis
Share and explain individual hobbies, talents, and interests.	Growth involved in developing hobbies, talents, and interests Importance of appreciating hobbies, talents, and interests of others
Use a pupil-planned questionnaire; interview classmates, teachers, parents, and community leaders to gather information for a Who's Who and Why project.	Importance of learning to record accurately, to hold conversations easily, and to approach people pleasantly Development of interest in biographical sketches
Begin to compile individual and group scrapbooks on: City, state, national, and international headlines Pictures of interesting occupations Hobby ideas News stories about classmates and schools.	Realization that interest in the lives and work of others is stimulating and broadening
Write a short autobiography with illustrations. Make a movie projector using a box, two round poles, and four clamps.	Importance of having events in the correct sequence Significance of gaining status with one's peers
Adopt an institution. Compose and copy group messages regularly. Choose one copy to send.	Importance of being able to write legibly Significance of exchange of ideas with other groups
Plan a visit to an institution to share hobbies and talents. Discuss proper behavior and attire.	Satisfaction that comes from thinking of others Practice in making plans for a satisfactory excursion
Exchange individual and group letters with children in other sections.	Reasons for likenesses and differences of people Necessity of learning to read and write if communication is to be enjoyable and worth while

Culminating Activity

Invite parents, representatives of adopted and visited institutions, school representatives, and pen pals to a club meeting. Follow agenda as outlined below:

Business meeting to demonstrate knowledge of parliamentary procedure

Program
  - Explain club motto, pledge, rules.
  - Give talent show.
  - Display hobbies.
  - Exhibit scrapbooks and charts.

Serve refreshments.

Illustrative Units for Pre-Fourth Grade

Significant community experiences are motivating factors for developing units of study for children at this level. A brief report of such a community unit and suggestions for others follow.

The Little Miami River in Time of Flood

Purpose of Unit.--The objectives of the teacher in planning the unit were to:

Familiarize children with their immediate surroundings

Produce a "bridge" unit between immediate environment and the outside world

Show how a city-wide emergency may affect places outside the city or local community

Show how people help each other when there is trouble

Show how help can come from outside the city

Teach something of conservation of resources and prevention of controllable crises

Show that this control is sometimes city-, state-, or nation-wide, rather than restricted to the local community

Provide opportunities for the development of language arts skills.

Scope of the Unit.--In developing the unit, the teacher covered a wide range of topics, such as:

Ways that people help each other in emergencies, both local and national

Effect of floods on power, houses, crops, land, roads, and people

Flood control devices, such as dams, flood walls, reservoirs

Erosion and control

Co-operative needs in controlling floods

Water pollution during non-flood times.

A wide range of activities also was covered. Many of the activities were related to language arts as well as social studies. They were:

Studying city, county, and state maps

Studying the river and the river valley through actual field trips

Discussing personal experiences with floods and their results

Writing permission slips for trips

Writing stories about floods

Doing research for oral and written reports

Writing and reading experience charts

Discussing major topics.

Samples of Children's Work.--The following report written by a child during this unit indicates how he extended his horizons beyond his immediate community.

> "The Little Miami River begins near Plattsburg about eleven miles east of Springfield. On the way to the Ohio River there are several good sized creeks. The first one is Caesar's Creek. The next is Todd. Then right below Milford the east branch of the Little Miami empties into the Little Miami. The Little Miami empties into the Ohio River about one mile below Coney Island. The Little Miami is about 70 miles long. At King's Mills there is a dam and a small mill. It is very beautiful. There are lots of summer camps. The Ohio River runs into the Mississippi. When the Little Miami, Ohio, and Mississippi Rivers are flooded they are very wide."

In the same unit, the children discussed conservation and gained some skill in making a summary when they dictated the following outline to the teacher. The outline was put on a chart and served as a basis for a reading lesson for slower children.

When a Flood Comes

1. Water gets in your house and yard.
    a. Sometimes you have to move.
    b. Sometimes you have to stay in the house.
    c. Sometimes you have to move furniture upstairs.
    d. Sometimes there is no heat in the house.
    e. Sometimes there is mud all over the basement and furniture.
    f. Sometimes your car is ruined.
    g. Sometimes your house floats.
    h. Sometimes the animals drown.
2. Flood tears the streets up, and the water cracks the streets and sidewalks.
3. Floods cause landslides.

4. When the floods come, many roads are closed.
5. Floods can stop electricity and telephone service.
6. The streets are slippery.
7. Bridges sometimes fall down.
8. Sometimes the flood breaks the flood wall.
9. The flood will ruin crops.

Through a child's creative writing, the teacher learns to know him and his problems and has a basis for evaluation of his growth in social studies skills.

During a Flood

Most people move away during a flood. And if they don't some of them move their furniture and they take their pets with them. They go to a Red Cross shelter. There they are given food and a place to sleep.

When they have to go out in the water they wear long boots. Sometimes they cannot get out of the house because the water is too high and they use boats.

Each day they go back to see if the water has gone down. When it has, they clean their homes and move back into them. The best thing would be to move away from the flood district, but no one wants to leave their home which they love.

How People Need and Help Each Other During a Flood

We all work together. We listen to the radio for the river reports. Then if it is to be a high flood our work starts. We take out our furniture or put it up in a high place and leave our house to stay somewhere else till the water goes down. Then if the water gets in our house there is always lots of work to do to clean up so we can go home.

Additional Community Units

Each community offers many opportunities for a slower learning child to start with his immediate environment which he has been studying in the primary grades and gradually extend his horizons to include many interesting places far removed from his own familiar surroundings. Two such opportunities are described briefly below by the teachers who developed them.

Different People in a Community.--The children read a story in their Weekly Reader about Hawaii, our fiftieth state. They found out that the population included many different nationalities.

Hawaii's People

Japanese	35%
White	25%
Pure or part Hawaiian	18%
Filipino	12%
Other	10%

This chart led to a discussion of the many different peoples in their own community. A study of any one of the nationalities could provide a lead into the study of the country from which that person came.

Interdependence of People in Different Communities.--During a discussion about communities in other parts of our country, the boys and girls in our class talked about how the people in one area depend upon other communities for food, clothing, shelter, and other necessities of life. The discussion then centered upon the types of community businesses which helped people in other parts of the nation.

After investigation, pupils found that their community had factories that manufactured pianos, steel, rubber, and wood products. There were packing houses, bottling companies, laundries, grocery stores, banks, and clothing stores.

The children learned that people in other communities sent trucks to transport local products to their own areas for distribution, that some things were shipped by express cars, that products were sent into our community from other areas; and that we depend on them and they on us.

This unit could open avenues of inquiry about almost any part of the world. Pupils might set up problems that involve a search for the sources of raw materials used in local industries or of products sold in our stores. Other points of view might involve following these products to their market, or studying the history of our community and the people who have influenced its growth.

Illustrative Area Units for Fourth Grade

General Introduction

The area units, for which detailed activities and accompanying emphases are suggested in this section, may be initiated in a variety of ways. General motivating procedures and ways of building background for any of these units are listed below:

Have children tell what they know about an area.

Have children ask the things that they would like to know.

Have children tell what they think the area is like. Chart impressions for comparative purposes when a specific area unit is completed.

Read stories about area heroes and ways of life.

Display and discuss books, pictures, and articles about the area.

Invite resource persons to talk about their experiences in the area.

Plan an itinerary for an area tour.

Have a bulletin board display of postcards from people who have visited or have lived in the specific study area.

Show films, slides, and filmstrips.

Show displays from the Museum of Natural History.

Discuss news headlines about the area.

Locate study areas on maps and the globe to show their relationship to Cincinnati, and to other studied areas, to the equator, and to the poles.

The activities and emphases described under specific areas can be adapted to other units. It is hoped that the suggestions that follow will point to other activities to be tried in developing the understandings and attitudes listed in the major goals. The teacher also should become thoroughly familiar with the units in the *Intermediate Manual, Revised*, in order to take advantage of suggestions which may be appropriate for a slow group.

Living in a Mountainous Region: Switzerland

Introduction.--See *Intermediate Manual, Revised*, page 117, for the general point of view in developing this unit.

Activity	Emphasis
Dramatize appealing parts of the stories of William Tell and Arnold von Winkelried. Discuss how to include parts that stress worth of the individual as well as love of freedom.	Love of freedom and worth of the individual
Make a picture book of Swiss heroes or illustrate the story of their struggle for freedom.	Contributions of citizens for the advancement of their country
Read an account of the founding of the Red Cross; make a filmstrip showing this historical story.	Humanitarianism of the Swiss

Activity	Emphasis
Make picture posters showing how the services of the Red Cross help.	Interdependence of all people
Fill Red Cross boxes.	Importance of being thoughtful, responsible individuals
Discuss Switzerland's size and its landlocked aspects. Reproduce a map of Switzerland, labeling it and its neighboring countries.	Significance of political and physical aspects of a country Significance of location upon the life of the people
Construct maps with accompanying key to show land and water forms.	Understanding of map symbols
Listen to stories and study pictures on the various geographical aspects of Switzerland.	Importance of listening as an aid to learning
Make illustrations of charted words or phrases that have geographic significance.	Development of a meaningful geographic vocabulary
Make simple reports on: Valley meadows Alpine pastures Woodlands Snow-capped rugged peaks.	Effect of land elevation on vegetation and climate Understanding of the variance in climate within one country
Plan a progressive View Master showing. Place machines in different window sills so that a consecutive panorama may be enjoyed without changing films.	Appreciation of the scenic beauty of Switzerland
Watch and discuss the film, "River of Ice," #1541; plan a visit to a power plant.	Importance of water power in Switzerland and use of electricity for transportation and industry
Work in small groups and list questions about family life, seasonal activities, and ways of making a living. Watch the two films, "Mountain Farmers in Switzerland," #1993; "Children of Switzerland," #1105; and the filmstrip "A Family of Switzerland," #6315, to find the answers to these questions.	Use of land and animal resources in making a living Development of ability to watch a film to note specific details
Visit a local dairy to see how cheese is made; have a cheese-making project at school. Make short written reports on the visit and the room project.	Development of ability to report sequential activities properly Practice in planning and completing a project

Activity	Emphasis
Dramatize the cow parade and the mountain pasture activities. In preparation for dramatization, illustrate appropriate costumes and setting.	Appreciation of colorful costumes and seasonal activities that are a part of Switzerland's tradition Participation in an activity that stresses language arts skills
Plan a mural that contrasts life in the village and life on the high pastures.	Necessity of using land and resources to the best advantage
Make reports on the cultivation of vegetables, the types of homes, and the domestication of animals.	Necessity of people adapting their living to their environment
Make post cards with pictures of resort life on one side and a place for name and message on the other.	Importance of tourist trade in Switzerland Significance of natural beauty and climate as tourist attractions
Display authentic Swiss products or creatively designed facsimiles. Such an exhibit could include: watches and clocks, embroidery and lace, music boxes, jewelry, cheese, wood carving, chocolate, precision instruments.	Appreciation of this country's expert craftsmen and diligent workers Realization of the variety of Swiss exports
Make picture booklets of major Swiss imports and exports.	Interdependence of nations Knowledge that products of an area are generally related to available raw materials
Plan an exhibit showing the intricate parts of a watch or clock. Write simple sentences explaining its intricacies.	Interdependence of men within factories Importance of written expression in communicating ideas
Develop a group or individual travel diary into which are written day-by-day accounts of an imaginary trip through Switzerland.	Development of ability to make a choice between important and unimportant details
Make simple models of bridges, tunnels, highways, railroads, and airways. Invite another class in to hear oral explanation of the project.	Realization that efficient, safe transportation is dependent upon many groups of knowledgeable, energetic, dependable, well-trained workers
Plan a bulletin board display around lettered captions, such as: "Switzerland, the Playground of Europe." Include pictures showing sledding, skiing, swimming, boating, mountain climbing, trout fishing, bicycling.	Development of critical thinking Opportunity to use organizational skills Development of citizenship activity to make classroom attractive through group planning and execution

Culminating Activity.--Have the class organize the classroom as a hotel, with invited guests as tourists. A child acting as hotel manager will register the guests, tell them what entertainment is to be provided, and call upon guides to take them on a tour of the room. Following the tour, guests may be seated for entertainment and refreshments. The properties needed are listed below:

Tour:

Notebooks of children

Exhibits of articles

Murals

Dioramas

Children's maps

Children's drawings with captions

Entertainment:

Roll movie made by children

Opaque projector showing of pictures made and explained by children

Puppet show

Dramatization

Songs and dances with appropriate costumes

Refreshments:

Swiss chocolate, cheese, fondue

Living in the Polar Regions: The Far North

Introduction.--See the Intermediate Manual, Revised, page 123, for the general point of view in developing this unit.

Activity	Emphasis
Make salt and flour relief maps of the Far North areas. (2/3 salt, 1/3 flour, water)	Understanding of the location and extent of North Polar Region
Make dioramas of mountains, islands, rivers, bays, and gulfs.	Ability to visualize the physical features of the North Polar Region
Work with teacher in making a demonstration of a volcanic eruption. (Make plaster volcano and add water to dry ice.)	Realization that volcanos exist in Alaska; ability to visualize the way an erupting volcano looks

Activity	Emphasis
Work with teacher to discover the causes for day and night and for the seasons. Use a globe and a flashlight to demonstrate rotation of the earth and the revolution of the earth around the sun.	Understanding of the reasons for having two seasons and the midnight sun in the North Polar Regions
Make cutouts of land areas above the Arctic Circle, and mount on blue flannel.	Ability to visualize the variety of land-mass shapes within this region
Cut out of styrofoam or model of clay the general outline of the region. Pin names of cities to substance.	Understanding of the contour of a region
Tell a story about the land and water forms in the region, using words that have been charted or put on flash cards.	Development of a meaningful vocabulary through oral expression
Make travel folders out of construction paper by stapling in hand-drawn pictures. Write captions and simple sentences to describe pictures.	Development of ability to select the most important concepts learned Development of critical thinking processes
Match scrambled captions and pictures.	Development of ability to look and think critically Motivation of interest in learning geographic concepts
Make a chart showing pictures of fur-bearing animals with accompanying samples of processed fur.	Importance of the animals in the North Polar Region to people everywhere
Make a life-sized cutout of an Eskimo from paper. Make outer clothing for the cutout. Write simple sentences explaining from what raw material each item of clothing is secured and how the raw material is made into a wearable item.	Realization of the extent to which animals are used for clothing Understanding of the importance of natural resources in supplying basic necessities Development of understanding of the relationship between environment and patterns of living
Watch the movie, "The Long Day," #1866, to gather information for an oral report upon an assigned topic.	Understanding of the habits and customs of the Eskimo Development of ability to analyze visual aids for selected information
Construct a mural of a whale hunt.	Realization of the labor, the strategy, and the teamwork that are involved in getting the necessities of life Development of ability to report in proper sequence

Activity	Emphasis
Draw pictures that show resources and the ways they are used. Write simple sentences to explain.	Knowledge of the resources in the North Polar Region Appreciation of the Eskimo's insight
Make a chart designating the resources found on the ground, below the ground, and in the sea.	Development of ability to think critically
Construct an igloo using chicken wire, milk bottles with sand, poles, and white kraft paper.	Appreciation of the teamwork that the Eskimos demonstrate. Importance of natural resources to supply Eskimo's need for building materials
Work with corrugated paper, sod, clay, and chicken wire to construct a sod house.	Realization that seasonal changes require adaptations of shelter
Using balsa, paste, pins, and construction paper make: harpoons, moss lamp, fork, ulu, snow goggles, bow-drill, spoon, kayaks, needle, snow knife. Make mobiles of these by hanging them from wire on coat hangers.	Realization that environment creates the need to invent in order that basic needs may be met Appreciation of the Eskimo's skill in handicrafts
Write a poem about life in the North Polar Region.	Development of interest in and appreciation of ways of living in the North Polar Region
Collect and display labels from cans or packages of food that contain products from the Far North.	Appreciation of the fact that needs of people in one environment help people of other environments. Development of an incentive for reading
View again the movie, "The Long Day," #1866, to note the responsibilities that each community and family member has.	Appreciation of the individual worth and importance of every person. Ability to select specific items of information from a mass of general material
Construct an authentic model of an Eskimo village with family houses, community buildings, and community members in which family and community activities can be dramatized.	Realistic understanding of the role that each person plays as he shares responsibilities in community and family living
Construct totem poles, and give reports on Eskimo ancestry.	Appreciation for Eskimo traditions and heritage

Culminating Activity.--Present a puppet show that portrays various aspects of life in the North Polar Region. Puppets may be made from plasticine, light bulbs covered with papier-mache, paper bags, or pipe cleaners.

Living in a Hot, Wet Region: The Congo

Introduction.--See Intermediate Manual, Revised, page 125, for the general point of view in developing this unit.

Activity	Emphasis
Construct a large map of Africa. Outline the Congo. Locate and mark the main cities and the Congo River.	Understanding of the physical and political features of the Congo
Make two terrariums. Place one under a heat lamp. Water both daily. Compare the growth of the plants.	Understanding of the effect that heat and water have on vegetation
Make booklets of the animals that live in the Congo. Find pictures in magazines or draw pictures for the booklets. Write several sentences about each animal.	Appreciation of animal life in the Congo Importance of written expression in developing ideas
Make a large palm tree. Cover a pole with burlap; use crepe paper for leaves. Make a list of the various uses the Congolese make of the palm tree.	Importance of the palm tree to the Congolese Resourcefulness of the people in making use of the natural resources of the Congo
Make a picture map of the minerals of the region. Report on mining in the Congo.	Realization of the fact that this region is the world's greatest source of diamonds and uranium Appreciation of the Congo's contributions to the world
Make a mural showing transportation through the jungle, around the waterfalls, and in the cities.	Understanding of the influence of land and water features upon ways of transportation
Display products from the Congo: articles made of ivory and ebony, rubber products, coffee, cacao, copper, and others. Write simple sentences explaining the source of each.	Knowledge of the origin of well-known products Development of vocabulary and written expression skills
Dramatize an elephant hunt.	Understanding of the problems encountered in making a living in a jungle
Find information from the text, Our Big World, about the kinds of food, clothing, and shelter found along the Congo River.	Understanding of the way the Congolese adapt to their environment and of the effect that climate has on plant and human life
Report on library books; read about people of the Congo.	Development of an interest in and respect for other peoples

Activity	Emphasis
Make a chart showing favorite foods, such as manioc, bananas, rice, and other vegetables.	Knowledge of the foods which grow in a hot-wet climate
Build a large model of a Congo hut, substituting materials on hand for the materials used by the Congolese.	Realization that the Congolese build their huts from materials found in the forest and along the river
View the movie, "Pygmies of Africa," #1121, to find the ways in which the environment of the pygmies has caused them to be a backward group.	Realization that geographical isolation brings a harder way of life and fewer opportunities Importance of understanding rather than criticizing the Congolese
Make a diorama of a jungle village.	Development of an understanding of the different types of shelter found in a village
Draw pictures of some of the native costumes. Dress figures in cutouts of costumes. Write simple sentences explaining the reasons for the type and amount of clothing.	Realization that environment influences dress
Dramatize the day of a boy and girl in a Congo village.	Understanding of the fact that environmental situations affect the duties of boys and girls
Make a dugout of cardboard or a block of soft wood.	Appreciation of the way Congolese use environmental resources to supply their needs
Draw a picture of the new flag of the Congo. (6 small and 1 large yellow star on a light blue background: adopted in 1962) Write simple sentences to explain the stars.	Understanding of the meaning of the flag in terms of the six provinces under a central government Development of a meaningful vocabulary
Collect current newspaper articles and pictures of the Congo. Prepare a bulletin board with a caption written by the pupils under each article.	Appreciation for the Congo's recent struggle for independence and its difficulty in establishing a government Development of written expression skills
Arrange a picture gallery showing the modern cities of the Congo.	Recognition of changes, due to improved communication and the development of natural resources

Activity	Emphasis
Show the movie, "Bantu Girl," #2075. Divide into committees to look for information on city houses, streets, buildings--types and construction--and city transportation. Compare with things seen in Cincinnati.	Comparative evaluation of city life in the Congo and city life in Cincinnati Development of ability to think critically Development of small group responsibility to total group as sharing begins
Develop a chart contrasting Congo city life to that of Congo village life in respect to: housing, transportation, recreation, occupation, food, and clothing.	Development of an understanding of the differences between city and village life
Plan an imaginary trip through the Congo using various, suitable means of transportation according to the route.	Realization that changes in air, land, and sea transportation result in modifications of the basic way of life
Discuss and view the different groups of people in the Congo; draw and display a life-sized picture of each. Include Pygmies, Watusi, tribal chiefs, westernized Congolese, and white residents.	Realization that the various groups of people now living under a central government are very different in background, language, and customs
Make a drum by stretching rubber from an inner tube over a circular cardboard box. Secure the rubberized material with string lacings.	Resourcefulness of the people in constructing this important means of communication
Visit the Art Museum and Museum of Natural History to see African works of art.	Appreciation of the natives' creative expression of their love for nature
Listen to music from the Congo. Discuss the instruments that are heard.	Appreciation of the strange chanting quality of the unfamiliar music Development of an interest in unfamiliar musical instruments
Learn the English translation of Congo songs.	Realization that song content deals with the environment and its effect upon the people
Watch the dance scene in the film, "Watusi of Africa," #1120. Discuss: The purpose of the dance The instruments used for accompaniment The types of costumes worn The participants.	Understanding and appreciation of tribal dances Importance of dancing to the lives of the Congolese

Activity	Emphasis
Learn the song, "The Magic Tom-Tom."[1]	Importance of drums as a means of communication in the jungle areas

Culminating Activity.--Plan and present to an invited audience a dramatization on life in the Congo. The following steps are suggested for this all-inclusive activity:

As a total group, summarize and organize major learnings and plan the number and types of scenes.

In small committees work out characters and conversation for each scene. Plan properties, scenery, rehearsals, costumes, make-up, invitations.

Individuals take responsibility for being stage manager, prompter, curtain puller, announcer, ushers.

Living in a Land of Great Variety: Mexico

Introduction.--See Intermediate Manual, Revised, page 127, for the general point of view in developing this unit.

Activity	Emphasis
Use clay or any other manipulative material to make a raised map of Mexico, with bodies of water and land forms labeled.	Understanding of the physical features of Mexico Development of meaningful geographical vocabulary
Make a chart listing the various types of land and water forms found in Mexico. In one column, write the general meaning of each type; in a corresponding column, write its specific Mexican location and name.	Development of a meaningful geographical vocabulary
View films that show various sections of Mexico; discuss the three regions of contrasting climates. Organize into three groups to make maps that show the vegetation in each of the climate areas. Discuss this comparative study.	Understanding of the effect of climate on the type of vegetation found Participation in group efforts to organize information and prepare a report

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[1] James L. Mursell and Others. Music Near and Far. New York: Silver Burdett Company, 1956. p. 87.

Activity	Emphasis
Display foods that are considered Mexican foods. Give oral reports on each food explaining the plant or animal from which the food originated, the care that went into its development, and the process that gave it its final form.	Realization that a country's food is related to the climate and soil of the area, and to the creativity of the people
Make a map showing the location of principal cities in Mexico.	Understanding of the reasons for the development of cities and of the relationship of city growth to progress
Plan a bulletin board showing the uses of the plants and animals in Mexico. Each plant and animal should have a label and a legend.	Appreciation for the resourcefulness of the Mexican people in satisfying their needs Development of skill in organizing material
Make drawings of and label the separate items of apparel worn by boys and girls. Write simple sentences telling why each is worn and from what it is made. Suggested items are serape, reboza, mantilla, sombrero.	Realization that the environmental conditions influence the type of clothing that is worn Development of written expression skills
Make life-sized figures of a Mexican boy and girl. Make festival, city, and village clothes for them. Chart the differences and similarities between Mexican clothing habits and those of Cincinnati boys and girls.	Appreciation of reasons for wearing different types of clothing under different circumstances and in different areas
Make drawings showing noon-time activities in Mexico. Write simple sentence explanations.	Understanding that the climate conditions, not laziness, create the need for noon-time inactivity
Write letters to people who have been to Mexico asking to borrow objects for a Mexican exhibit. Follow up with thank-you letters.	Importance of correlating social studies and written expression Realization that borrowing carries with it specific responsibilities and obligations
lan the building of a market scene using clay, wood, and paper models for the wares sold. Play the roles of sellers, native buyers, and tourists.	Realization that making a living and the enjoyment of living are dependent upon the harmonious, interrelated activities of many people

Activity	Emphasis
Watch films, listen to news headlines, and report on stories about modern Mexico. Give oral reports on changes in education, home life, industry, farming, communication, transportation.	Realization that progressive changes develop in proportion to interchange of ideas and economic growth
Share current events about Mexico.	Development of skills necessary for reading newspapers and magazines intelligently
Learn to do some national folk dances.	Appreciation of the leisure time light heartedness of the Mexican people
Listen to stories about religious holidays. Discuss the way that the Mexicans seem to feel about their ceremonies.	Realization that the religious faith of most of the Mexicans is a serious and essential part of their lives Development of the ability to find hidden meanings in stories
Make a comparative list of the recreational activities that Mexicans enjoy and the ones that we enjoy in the United States. Note similarities and differences. Make a diorama of each of these Mexican activities with simple sentences of explanations.	Appreciation of the leisure time activities in which the people engage Development of skills needed to make comparisons

Culminating Activity.--A preplanned exhibit of the developed activities, followed by a question and answer period not only would give initial motivation to the study of Mexico but also would challenge each child to have his major learnings well in mind so that he can ask and answer questions intelligently.

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CHAPTER 5. ARITHMETIC

An Arithmetic Program for Low Achievers

To the degree that teachers are successful in helping low achievers to understand the meanings and operations in arithmetic and to appreciate the value of arithmetic in modern society, these boys and girls may be motivated to continue their study of arithmetic at increasingly higher levels. A ceiling should never be placed upon their learnings. Moreover, parents, teachers, and all concerned should work together in the recognition that low achievement does not necessarily mean a child is lazy or disinterested; a child's aggressiveness, sullenness, or hostility may spring from his repeated failure to realize even a small success. Time, guidance, encouragement, together with concrete situations and appropriate materials are required if the low achiever is to gain understanding of the basic concepts of arithmetic.

General Goals

General goals for the low achiever in the elementary school include:

A wholesome attitude toward arithmetic

A desire to attain the arithmetical skills essential to work efficiently now and later

Mastery of operations with whole numbers

Sufficient understanding of fractions and decimals to use them in everyday applications

Problem-solving ability in practical situations

The ability to identify and reproduce simple geometric forms

A working knowledge of different measures and their use.

Methods of Working with Low Achievers

The arithmetic program should be organized so that the low achiever can experience success and will be challenged to acquire new skills. This means that instructional procedures must be appropriate in difficulty, sufficiently varied, and sequential in development.

These children should be as free as possible from compulsion of time or unrealistic standards of achievement. The daily program should provide for alternating activities; e.g., movement or rest, discussion or concentrated effort, class teaching or group and individual activities, background experiences or skills.

Practical ways of helping all children achieve success are stated in the Intermediate Manual, Revised, page 165. In addition, however, certain emphases should be kept in mind when working with low achievers. There is a need to:

- Provide many opportunities to work with manipulative materials for discovery, reteaching, and checking
- Vary the activities because of short attention span
- Individualize instruction when possible
- Be alert to the many current happenings which provide interesting and profitable applications of the use of number
- Select the procedure which seems best suited to the learner
- Provide large amounts of drill in many interesting ways
- Review frequently
- Give the children time to develop understandings
- Select word problems which are within the pupil's reading ability
- Help the pupil identify his strengths and weaknesses, and enlist his co-operation in attacking specific deficiencies
- Focus attention on positive values so the pupil's self-concept will be a worthy one.

Inventorying for Group Placement

There are many techniques for determining the achievement level in arithmetic. The cumulative records indicate academic progress in previous grades. These records also provide other pertinent information that will give insight into the achievement and potential of individuals and groups. Other techniques useful in inventorying and establishing instructional groups are found in the Intermediate Manual, Revised, page 167.

The teacher should use various techniques at regular intervals to identify weaknesses in the children's work. Diagnosis and remedial work should follow.

Scope of the Program

The arithmetic program for low achievers is designed to develop understanding of and skill in the use of our decimal system of numeration; computation with whole numbers; the use of common and decimal fractions; and the interpretation and use of measurement, graphs and scale drawings, and geometric forms. Each of these phases of the program is developed in considerable detail later in this section. Appropriate learning activities, listed for each of the above phases, stress the necessity of building an understanding of a given process before pupils attempt to gain skill in its use.

Problem Solving

Suggestions for problem-solving procedures are listed on page 166 of the Intermediate Manual, Revised. In addition to these procedures, attention should be directed to the special reading skills required for arithmetic.

Arithmetic has a specialized vocabulary for which meanings must be developed. Pupils should be directed to read problems slowly, with close attention to detail. Lack of attention to a word, a punctuation mark, or a mathematical symbol may change the entire meaning of a problem. Increased skill in problem solving may result when pupils learn to read problems with greater understanding. Suggestions for building accuracy in reading are listed below:

Develop reading readiness by relating past experiences to the new problem situation.

Have the problem read more than once.

Have pupils read the problem silently before it is read orally.

Discuss and illustrate words and phrases which cause difficulty.

Encourage children to tell what the problem asks and to restate it in their own words.

A suggested procedure for helping children solve a problem follows. First of all, the teacher makes sure the pupil can read the problem. Words which may give difficulty are identified, and help is given. The problem is discussed. Questions asked might include:

Do you understand the meaning of all the words?

What do you need to find?

Do you have all the information you need?

Is there anything in the problem you do not need to use in order to find the answer?

Is there some hidden work in the problem?

How would you state the number sentence before you begin computation?

What do you estimate the answer will be?

Could you solve the problem more than one way?

Does the answer make sense?

How can you check this problem?

Do you know more than one way to check this problem?

Essential Language Arts Skills

The arithmetic teacher must accept responsibility for building the skills and background related to other subject areas which increase competency in arithmetic. Reading skills and the ability to communicate ideas are necessary for the comprehension of arithmetic. Special emphasis should be given to the development of an arithmetical vocabulary and skill in verbalization and reporting.

Children need to learn the arithmetic vocabulary which will help them in discussing the processes with which they are working. Interest and success in gaining this vocabulary are fostered as the teacher:

Encourages the use of the exact words to express an idea

Discusses difficult words, terms, or computational symbols in order to clarify ideas

Has pupils construct drawings to show their interpretation of words and terms

Collects appropriate, related material to illustrate the practical use of words and terms

Encourages children to keep booklets or class charts of special arithmetic vocabulary.

Expressing a thought process verbally is particularly difficult for the low achiever. The teacher is responsible for helping pupils express their way of working through a problem. A classroom atmosphere which is free from tensions and anxieties concerning failure encourages the pupil to refine and sharpen the expression of his arithmetical discoveries as he works with exploratory materials.

Appropriate oral reports in the arithmetic class can help pupils gain self-confidence and increase their precision of expression. Sources for reports should be recent material written at a lower vocabulary level. A simple card file which records resources for topics will help teachers in supplying pupils with materials which they can use. For example, Elspeth Bragdon's Tell Me the Time, Please, contains information concerning measurement and is written at a third-grade vocabulary level.

Development of Good Work Habits

Ineffective work habits and methods of study often hinder a pupil from achieving in proportion to his ability. Faulty methods of work may be suspected when a child's performance is slow and clearly inferior to the expectation for a pupil of his mental ability. A personal interview or observation of the pupil may reveal that he does not have an effective plan for studying or proceeding with a task. Pupil responses which are random, erratic, or inconsistent may indicate a lack of basic understandings or perhaps an indifference to the work at hand. The need for reteaching is indicated. Some suggestions for fostering good work habits are:

Provide a quiet place for study.

Develop the concept before assigning practice work.

Plan carefully with the children so they will know what they are going to do and how they are going to do it.

Enlist the help of the children in setting up specific routines for the care and distribution of materials.

Encourage pupils to develop and maintain the habit of accuracy.

Teach correct numeral formation.

Establish standards of neatness for all work.

Enlist the co-operation of parents in establishing a suitable place for study.

Evaluation

The teacher needs to appraise the achievement of pupils as he begins working with them and should continue to do so at frequent intervals to measure growth in understandings and knowledge. He will make use of formal and informal testing procedures. In addition, the teacher will wish to record pertinent information concerning attitudes and interests; and skills in verbalization, critical thinking and the practical application of mathematical principles. Casual and planned observations and interviews will provide many opportunities for making appraisals and determining improvement.

The pupil's self-estimate is an effective aid to learning and progress. Low achievers need much guidance in realistically evaluating progress and in identifying specific areas of strength and weakness. The encouragement and co-operative direction of the teacher will motivate the pupil to determine his progress in reaching a particular goal. A check list, developed co-operatively by teacher and pupils, serves to define standards against which to measure individual achievement. The check list which follows suggests standards which may be adapted to fit the needs of a particular class.

ARITHMETIC CHECK LIST

Name ______________________ Grade _____ Teacher ______________________

Skills	Unit 1		
	Satisfactory	Unsatisfactory	Comments
Can discover meanings when given opportunity to explore with materials and abstractions			
Asks sensible questions			
Can express thoughts clearly			
Understands and uses correctly the special vocabulary of arithmetic			
Asks for guidance when something is not understood			
Takes time to think when working an example or problem			
Can state a problem in own words			
Can apply learnings to new situations			
Can illustrate meanings with objects or drawings			
Attempts to do computations accurately and checks results			
Can give a report in front of class			
Is careful about penmanship and neatness of written work			
Uses time wisely			
Shares group responsibility			
Respects the contributions of others			
Shows an interest in making new discoveries			
Knows facts: (Include comment concerning facts which pupil does not know) Addition Subtraction Multiplication Division			

Materials and Learning Aids

The teacher faces the problem of adjusting methods and materials to the varying levels of learning of pupils so that each one is challenged to work at his highest level of thinking. The material a child uses while learning about a process or topic must be determined by the teacher through observation and analysis of the pupil's work and responses. Materials are important and useful to both teacher and pupil in the development of understandings. A list of appropriate materials is included on page 169 of the Intermediate Manual, Revised. Suggestions for uses of these materials will be included in this manual with the development of the operations.

Individual Kits

A kit of materials should be available for each child. The contents of the kit should match the materials used in teacher demonstrations. These kits will vary according to pupil needs. A typical kit for the intermediate-grade pupil might contain the following:

Ten strips of groups of simple forms arranged by twos, ten strips arranged by threes, ten strips by fours, and so on to nines - to be used in discovering products and quotients

Ruler showing fractional parts of an inch, including sixteenths

Fraction kit which includes circles and fractional parts of circles, and squares or rectangles and fractional parts of these

Squares grouped as ones, tens, and hundreds

Everybody show cards (Explained below)

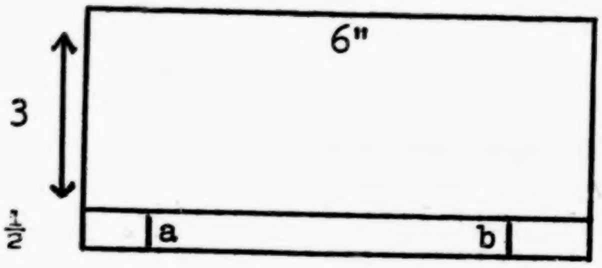
Place value chart and strips of paper.

Teacher-Prepared Material

While many manipulative materials and instructional aids are available through purchase or warehouse requisition, teachers may wish to construct a limited number of aids not included on the materials list. Directions are given for a few of these.

Everybody Show Cards:

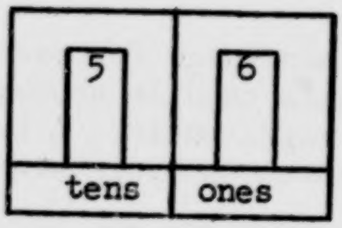
Each pupil has eleven cards 2" x 3" bearing a numeral 0, 2, 3, 4, 5, 6, 7, 8, and 9; two cards should carry the numeral 1. Numerals are large and printed legibly. Pupil also has a card holder made by stapling a fold in a piece of 4" x 6" construction paper.



Cards are used for practice on number facts in the four fundamental operations. When the answer to a fact is 11, two cards bearing the numeral 1 are placed in the card holder. For the grouping 6 x 9, the pupil would show 54 in the card holder; for the grouping 72 ÷ 8, he would place the card bearing 9 in the holder.

Pocket Chart:

A pocket chart is used by individual pupils in working with place value. A simple chart may be constructed by cutting a part from one side of a filing folder and leaving a two-inch piece which may be stapled for a pocket.



Number Line:

The number line is a graphic measurement device. It consists of a line segment divided into equal units. It is labeled (calibrated) at designated points to represent consecutive indicated numbers which are evenly spaced (equidistant). It extends indefinitely in each direction from a point of origin, known as zero.

The number line is a flexible teaching aid. It may be used to:

Develop ideas and pupil understanding at the transitory or pictorial level

Explore, discover, and verify

Show that, at any point on the line, a number so assigned may have more than one name, thus showing equalities

Indicate inequalities

Enumerate the fractional numbers between any two whole numbers

Indicate operations with numbers by a motion along the line.

Number line games provide motivation for some pupils. They should be selected and used with discrimination. Rules for the game include:

Deciding on a starting point

Deciding on a symbol

Deciding what is to be done with the symbol

Checking.

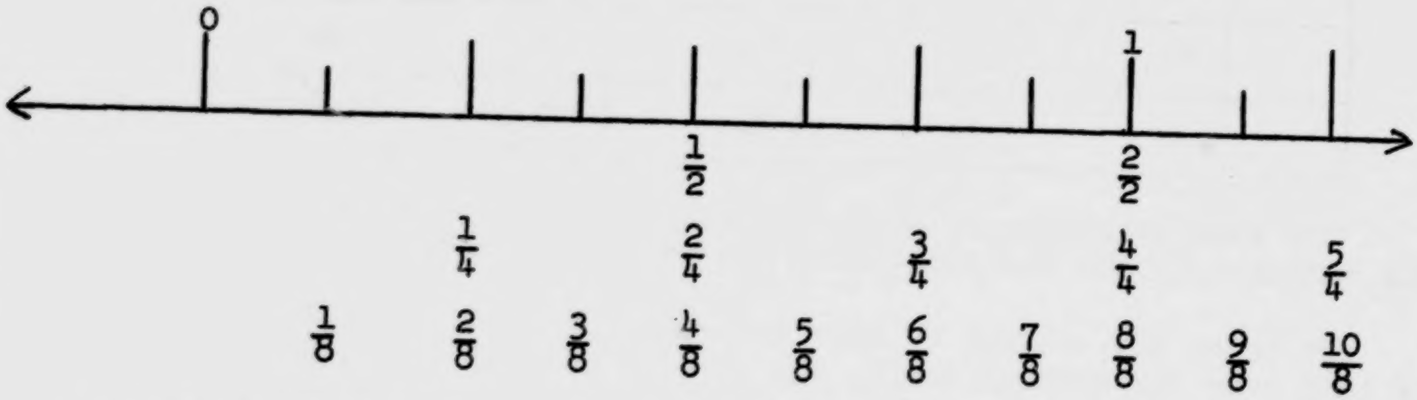
A number line may be constructed in a number of ways. The model included illustrates use to show operations with whole numbers, common fractions, and different names for the same number. Tokio-squared paper, adding machine paper, or bristol board are suitable materials.

One of the simplest types may be constructed by pupils, using lined notebook paper, placed sideways. The directions for making are:

Draw a line with a ruler, cross the blue lines, perpendicularly.

Number each point on the line consecutively, using whole numbers, common fractions, or decimal fractions.

Tokio-squared paper might be used in making a number line to illustrate different names for the same number.



Larger models of more permanent material, such as oak tag or bristol board should be constructed by the teacher for classroom instructional use. A floor number line may be constructed by stretching masking tape in a straight line along the floor. Short pieces of tape, placed at equal intervals along the floor, and movable number cards are used to mark the points.

Overlay Charts:

This teaching device helps children develop understanding of odd and even numbers and of counting in multiples. It is based on a hundred chart and a series of overlays. Suggestions for making the device are:

Use a portable flannel board, and insert several hooks on top from which the overlay paper will suspend.

Use 24" x 18" construction paper--a different color for each overlay.

In counting by 2's, first uncover and display the hundred chart. Now cover with the overlay which blocks out all the numerals not involved. It leaves only this:

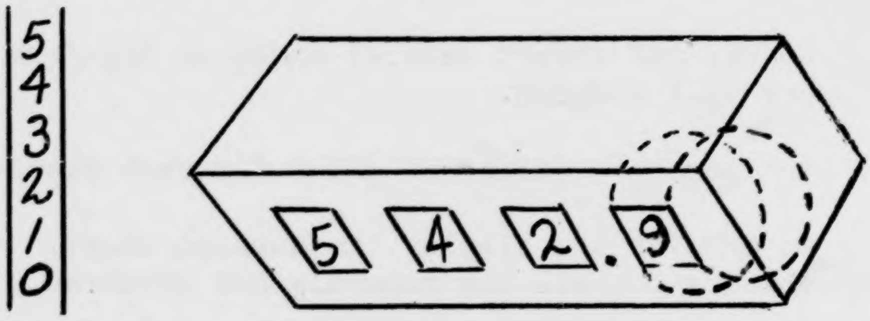
	2		4		6		8		10
	12		14		16		18		20
	22		24		26		28		30
	32		34		36		38		40
	42		44		46		48		50
	52		54		56		58		60
	62		64		66		68		70
	72		74		76		78		80
	82		84		86		88		90
	92		94		96		98		100

The same principle is used in counting by 3's, 4's, and 5's. Only the numerals in the desired series are left uncovered.

To teach the concept of odds and evens, a chart labeled "odds" can be laid over the hundred chart, and the 2's overlay can be used to demonstrate "even."

Odometer:

The odometer is useful in teaching understandings about decimals. This device is made from a shoe box and strips of paper. Four pairs of horizontal slits are made in the bottom of the box. Four strips of paper containing the numbers 0 to 9 are guided through the slits, and the ends are pasted together. These strips are then arranged so that the numerals which show represent a given number. When the strip of paper on the right is rotated so that it goes beyond 9 to 0, the next loop of paper is moved one unit; i.e., from 7 to 8.



(The odometer pictured shows 542.9)

Place Value Chart:

The place value chart helps pupils build understanding of our base-ten system of numeration.

To construct this device, the following materials are needed:

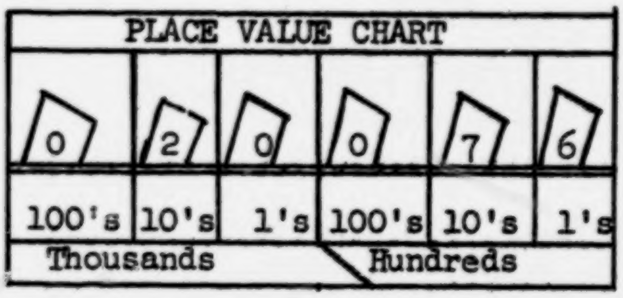
One piece of colored mounting paper

Pieces of tagboard, 2" x 3"

One colored strip for making the pocket

Magic marker.

To make the chart, draw lines as shown and letter. Attach pocket with rubber cement. Letter nine cards with zero. Make two cards for each of the numbers 1-9.



Place the chart in a chalk tray, and arrange the cards in order beside it. As a number is dictated, the pupil inserts the proper cards to represent it. Mistakes may be spotted easily on this chart. Its use helps to eliminate the zero difficulty because a child must place a number for each place value.

Our System of Numeration

Developing an understanding of our base-ten system of numeration is basic to the work which follows in addition, subtraction, multiplication, and division. The fourth-grade teacher of low achievers will need to spend the time necessary to assure understanding of the idea. Teachers of successive grades will need to reinforce these understandings.

Steps in Developing Understanding

The following review steps accompanied by appropriate experiences will help pupils to achieve the understandings indicated above:

Develop the understanding that only the numerals from 0 through 9 are used in recording a number in any place

Develop the ability to represent two-digit numbers with objects grouped as tens and ones and to write the symbols for the grouping

Develop the function of zero in writing a two-place number such as 60

Develop an understanding of numbers grouped either by tens or by ones--81 ones or 8 tens and 1 one

Lead to the generalization that it takes 10 ones to make one ten and 10 tens to make 100

Extend previous understandings to three-digit numbers through 999 and further as pupils are able to handle larger numbers.

Techniques and Practice Material

Grouping by Tens.--Use a variety of objects. It is preferable to have as many as 90 objects of each kind. Different pupils work with different kinds and amounts of material. They practice organizing the material into sets of ten. They record their observations in a variety of ways.

Tally

Tens	Ones	
/////	//////	= 56
5	6	

Understanding Place Value.--Use the hundreds board, the hundreds chart, a ten-tens counting frame, bundles of cards in a pocket holder, the computing abacus or other representative material to help clarify the meaning of each digit in a number or to explore the difference in two numbers having the same symbols but different meanings, as 34 and 43. The activities which follow should suggest many others which will build understanding of place value and component parts of numbers.

Each pupil is given a duplicated tally sheet with instructions to write numerals for the numbers represented in tally boxes.

Tens	Ones	Tens	Ones	Ones
///	//	3	2	32
/// //				
//// ////	//// /////			

Each pupil is given a duplicated sheet and instructed to write numerals and to make tallies for the given numbers.

Numerals				Tallies		
Number	Hundreds	Tens	Ones	Hundreds	Tens	Ones
121	1	2	1	/	//	/
206						
319						

The following exercise gives pupils practice in recognizing the composition of numbers:

__5__ Tens __9__ Ones = ______

__4__ Tens ______ Ones = __41__

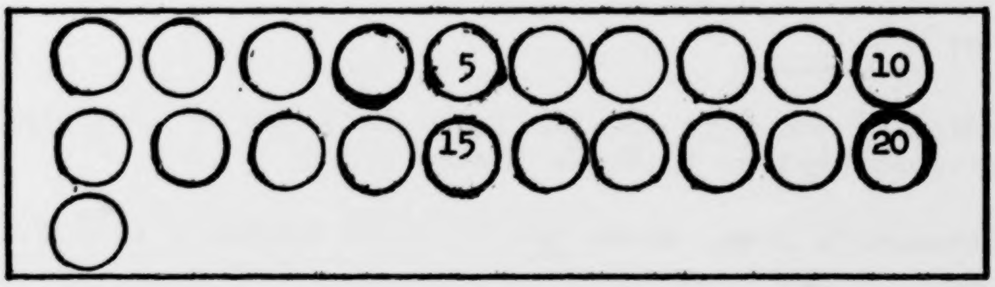
______ Tens ______ Ones = __62__

______ Tens ______ Ones = __90__

As pupils develop their understanding of three-place numbers, practice should be provided for breaking the numbers into tens and ones as well as into hundreds, tens, and ones, as shown below.

	Hundreds	Tens	Ones		Tens	Ones
100 means				or		
231 means				or		
196 means				or		

Relationship of Numbers.--Work with a hundred board with movable circles for covering numbers is valuable in helping pupils to gain insight concerning the size of numbers and their relationships to each other.



Circles are turned so some or all of the numerals are covered. At first, 5 and its multiples might be left uncovered, as in the above chart. A pupil is asked to locate the number 7. He might start with the 5 and count two more, uncovering the 7. He might start with the 10 and count back three. The teacher may then ask that 17 be located and help the pupil discover, through demonstration and discussion, that 17 is ten more than 7.

Pupils use an individual hundred chart, a piece of squared paper containing ten rows of ten squares each, or the large demonstration chart in locating answers for problems, such as those listed below:

The number which means 9 tens and 9 ones

The number 4 more than 56

The number which means 3 tens; 5 tens, and the like

The number which is 3 less than 20

The number which is 2 times 5

All the numbers ending in 2; all the numbers which are multiples of 2

All the numbers which can be divided by 10

The number which comes between 51 and 53

Symbols of Equality and Inequality.--Pupils should be helped to understand and interpret the following symbols used in reading and writing number sentences: > means "is greater than," < means "is less than," = means "is equal to."

The exercises listed below suggest ways to develop understanding of the symbol > (is greater than).

If the sentence is true, write yes in the blank. If it is false, write no.

58 > 5 tens and 8 ones ___ no ___

75 > 7 tens and 5 ones ___ no ___

75 > 6 tens and 15 ones ______

75 > 25 + 25 + 25 ________

75 > 10 + 10 + 10 + 10 + 10 + 25 ________

58 > 57 ________

Understanding of the sign < (is less than) may be developed through the use of exercises similar to those listed below.

If the sentence is true, write yes. If the sentence is not true, write no.

9 < 5 + 5 ___ yes ___

9 < 4 + 4 ___ no ___

9 < 6 + 3 ______

9 < 7 + 3 ______

9 < 3 + 3 + 4 ______

Most pupils understand the symool = which denotes equality. Those who need additional practice in using it correctly will profit by working exercises comparable to those which follow.

If the sentence is true, write yes. If it is false, write no.

2 + 2 + 2 = 3 + 3 ___ yes ___

4 + 2 = 3 + 4 ___ no ___

4 + 2 = 2 + 4 ______

5 + 4 = 6 + 3 ______

The Use of Whole Numbers

The material in this section deals with the four basic operations: addition, subtraction, multiplication, and division. It presents additional ways of helping the low achiever to discover the meaning of these operations and to use them effectively. Emphasis is placed upon the combining actions of addition or multiplication and the separating action of subtraction or division; subtraction is presented as the undoing of addition and division as the undoing of multiplication.

Addition of Whole Numbers

Children need to understand that addition is an extension of the counting process and that it is a combining action. Low achievers should start with simple combinations and work toward more difficult addition facts. The following series of developmental steps is suggested: combinations totaling less than ten, combinations using the doubles, combinations totaling more than ten, and addition combinations using zero. As these are taught, the relation of subtraction should be stressed also. Later the pupil should be taught carrying, adding by endings, bridging, and adding several columns. Problems involving several or all difficulties should be introduced. Ultimately, the child should be able to recognize problems which require the addition operation.

Adding Two- and Three-Place Numbers Without Changing.--It is a short step from addition combinations to the addition of two-digit numbers without changing.

Problem: Bob earned 43 cents selling papers on Monday and 21 cents selling papers on Tuesday. How much money did he earn in two days?

The pupil adds the ones column and the tens column. A graphic representation, such as the one below, may help to clarify further this type of problem.

	Tens	Ones
43¢	0000	000
21¢	00	0
64¢	000 000	0000

Addition may be extended to include three or more addends of two or three digits without carrying.

Adding by Endings.--Pupils may be guided to associate each simple combination with the higher decade combinations that correspond. Thus the combinations may be taught in groups as:

55	25	75	35	65	45	15	95
2	2	2	2	2	2	2	2

Having already learned that 5 and 2 are 7, the pupils discover that when 2 is added to a number ending in 5, the sum ends in 7. The reverse combinations should also be considered. For example,

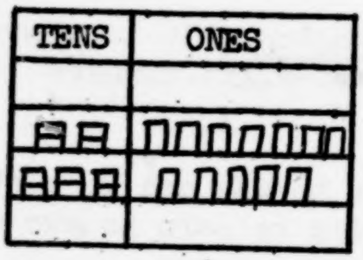
$$\begin{array}{r}25\\ \underline{2}\\ 27\end{array} \quad \text{and} \quad \begin{array}{r}2\\ \underline{25}\\ 27\end{array} \quad \text{or, } 25 + 2 = 27 \quad \text{and } 2 + 25 = 27$$

Adding higher decade combinations is developed in the Intermediate Manual, Revised, page 178. Two methods are developed: changing to a ten and bridging. Low achievers may find bridging the easier of the two methods. After the child has learned that 8 + 9 = 17, he is led to generalize that 18 + 9 = 27, 28 + 9 = 37, and the like. In any event combinations requiring no bridging should be taught first.

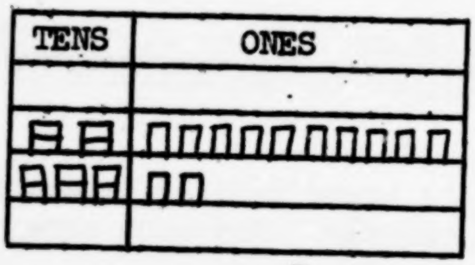
Adding with Carrying.--This is developed in the Intermediate Manual, Revised, page 178. Low achievers need to see this developed with manipulative materials.

Problem: The teacher has 27 red pencils and 35 yellow ones. How many pencils does she have in all?

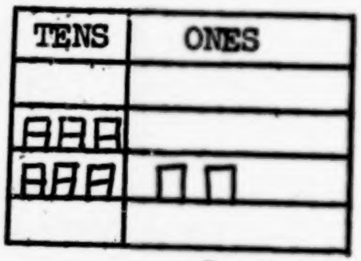
The process may be demonstrated with a place value chart.



A



B



C

Have pupils tell what each number represents in the different pockets in charts A and B. Are there enough ones to make a ten?

Have the children regroup as in C.

Make a symbolic representation of the process.

$$\begin{array}{rr} 27 & 2\text{ tens} + 7\text{ ones}\\ \underline{+35} & \underline{+3\text{ tens} + 5\text{ ones}}\\ & 5\text{ tens} + 12\text{ ones}\end{array}$$

12 ones are regrouped as 1 ten + 2 ones

6 tens + 2 ones = 62

Put a completed model on the board, and have the class tell the steps in the solution.

Have pupils generalize the process. When children can generalize the process, they are ready to practice addition involving changing.

Additional help for pupils who are learning to work with column addition includes:

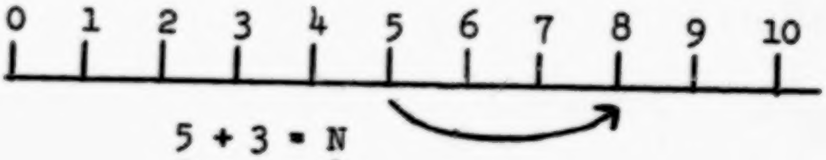
Counting by twos, threes, or any other number from a designated starting point to a designated stopping point. Pupils may be asked to start with 3 and add 5 to the succeeding sum.

Using magic squares, circles, and situations where the addition of columns with changing is necessary.

Activities for Strengthening Skills.--The activities suggested are designed to strengthen specific skills and should be used to help individual children overcome a particular weakness. They are not intended to be used with the entire class unless the class can profit from the activity. Some of the activities and games provide motivation and give practice, while others are intended as study aids.

Number Line Activities:

Show the problem 5 + 3 on a number line.



5 + 3 = N
5 + 3 = 8

Work these on a number line.

9 + 7 = N
19 + 7 = N
39 + 7 = N

Use a number line to answer the following.

A number which is 1 ten more than 20
A number which is 1 ten more than 15
A number which is 2 tens more than 20
A number which is 2 tens more than 30
A number which is 4 more than 9; a number which is 4 more than this number.

Pigeon Hole Parking:

Number of Players: Any number

Materials: A sheet of paper ruled into a hundred squares

Procedure: The object of the game is to park the cars correctly. The purpose is to gain skill in working with the addition combinations. A list of car numbers is given. The pupil writes the number of each car in the appropriate square. If a number could be placed in more than one square, it is written with a different color. No number above 18 is given.

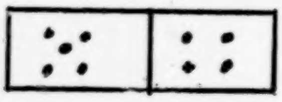
Example: Car number 15

15 may be placed in the squares designated by 9 + 6, 6 + 9, 7 + 8, and 8 + 7

	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										15
7									15	
8								15		
9							15			

Domino Cards:

Pupils may be asked to match domino dot cards with corresponding addition and subtraction fact cards.



5 + 4 = 9

9 - 4 = 5

Study Practice Cards:

Combinations with answers and pictorial representation are placed on one side of the card. Number sentence is placed on the other side of the card.

0 0 0 0
0 0
4 + 2 = 6
2 + 4 = 6

Front

4 + 2 = N
2 + 4 = N

Back

I Have Three Numbers:

Number of Players: 4-8

Materials: Cards with the numerals 1-19 written on them; a box

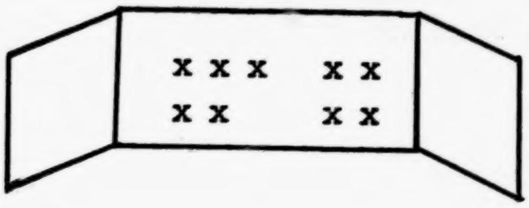
Procedure: The leader thinks of an addition combination whose sum is 19 or less; for example, 6 + 7 + 5. He places the three cards under the box and then calls on one of the players. Leader: "I have three numbers. Their sum is 18." James: "Do you have 6 + 4 + 8?" Leader: "No, I do not have 6 + 4 + 8." Tom: "Do you have 5 + 7 + 6?" Leader: "Yes, I have 5 + 7 + 6." The leader lifts the box to let the players see the numbers. The player who guessed correctly takes the leader's place, and the game proceeds as before.

Addition Fact Chart:

Chart paper ruled in columns may be used for this activity. Columns are labeled with numerals from 2 through 18. As a particular group of facts is mastered, a pupil records them in horizontal form under the appropriate heading.

2	3	4	5	6	7	8
1 + 1	1 + 2	1 + 3	2 + 3	5 + 1	6 + 1	7 + 1
	2 + 1	3 + 1	3 + 2	1 + 5	1 + 6	1 + 7
		2 + 2	4 + 1	4 + 2	5 + 2	6 + 2
			1 + 4	2 + 4	2 + 5	2 + 6
				3 + 3	4 + 3	3 + 5
					3 + 4	5 + 3
						4 + 4

Folding Cards:



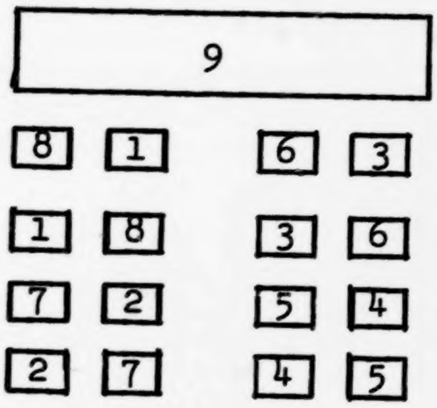
Use a sheet of tagboard or paper of similar weight 4" x 12". Fold down a 3" piece at each end. On the center piece, place a group of 5 red x's and 4 black x's. The red x's should be placed so that one flap will fold over these and the other flap will fold over the black x's. Cards could be used in helping pupils complete number sentences: as, 5 + N = 9.

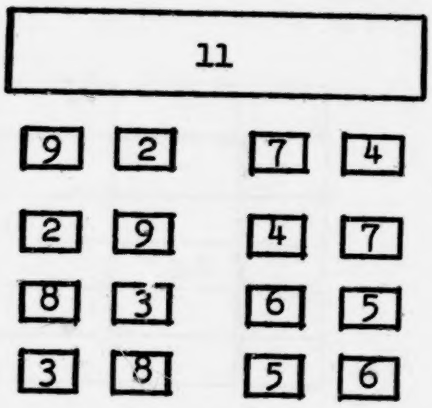
Number in the Box:

Number of Players: Two

Materials Needed: Two envelopes or boxes, each of which contains two sets of cards numbered from 1 to 9, and one set of larger cards bearing the numerals from 2 to 18.

Rules: Each player draws a large card. The object is to discover all the combinations which will total the number on the large card before his opponent completes the discoveries for the number on the card he has drawn.

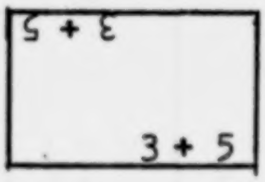




First Out Wins:

Players: 2 to 5

Materials: 45 cards (3" x 5"). Cut each card in half. Write an addition fact in opposite corners of each card.



Procedure: Each child receives 9 cards. Remaining cards are placed in a pile where they may be reached by each player. The object is to play a set of three or more cards with the same answer. If the player does not have a set of three or more cards with the same answer, he may draw any number of cards up to three and discard the same number from his hand. If it is necessary for him to draw cards, he may not play these until his next turn. The first player to lay down all his cards is the winner.

This game may be played with subtraction facts. The use of both addition and subtraction cards might be another variation. A winning set of cards would be three or more cards with the same answer for either sum or difference.

Review of Addition:

Have a pupil select a partner and a number. Then ask the child to give all the possible addition combinations which result in the answer 25. Have him write these combinations in a column. His partner checks the work. He, in turn, takes a number suggested by the first player and writes all the possible addition combinations for this number (without repeating the numeral 1.)

25	32
12 + 13	
10 + 10 + 5	
8 + 8 + 8 + 1	
7 + 7 + 7 + 4	
6 + 6 + 6 + 6 + 1	

Building a Random Number Table:

Pupils write their answers in the spaces provided.

	+3	+7	+9	+11
6				
4				
9	12			
2				
5				

Buzz:

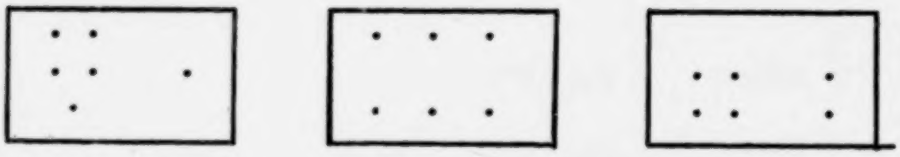
Number of Players: 3-15

Procedure: Pupils select a "Buzz Number"; for example, "4." They begin to count by 1's and substitute "Buzz" for multiples of the selected number. This may be varied by using the same procedure in the reverse. For example: begin with 21 and count backward--21, buzz, 19, 18, 17, buzz. The "Buzz Number" may be changed to fit the needs of the group.

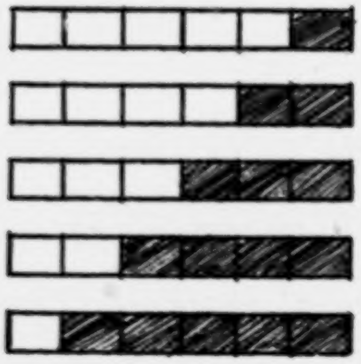
Subtraction of Whole Numbers

In teaching subtraction, emphasis should be placed on the idea that subtraction is a separating action and that it is the inverse or undoing of addition. Pupils should be taught to recognize subtraction situations--finding the remainder or difference and finding what must be added.

Procedures.--Low achievers need to use manipulative materials as aids in rediscovering the different ways a number may be represented with two groups of objects. As pupils verbalize about these discoveries, they should record them in horizontal and vertical form on the board, in their notebooks, or on the flannel board. This procedure helps children to reinforce understandings and to develop subtraction and addition families. For example, as a pupil works with six objects to see how many different ways he can arrange them in two groups, patterns such as these will evolve.



Squared paper, used for the same purpose, also gives a visual representation of the order (commutative) property of addition, $5 + 1 = 1 + 5$.



In working with large numbers, low achievers need to understand the relationship between the tens and ones columns. They need practice in working with the component parts of numbers to develop understanding of the subtraction operation and readiness for changing in subtraction. Such problems as those listed below help pupils develop skill in working with component parts of numbers.

Subtracting tens, with a zero in the ones column

Example: 16 tens - 8 tens = _____ tens

$$\begin{array}{r} 160 \\ -\underline{\ 80} \end{array} \qquad \begin{array}{rlrl} 16 & \text{tens} & 0 & \text{ones} \\ -\ 8 & \text{tens} & 0 & \text{ones} \\ \hline 8 & \text{tens} & 0 & \text{ones} \end{array} \qquad \begin{array}{rl} 16 & \text{tens} \\ -\ 8 & \text{tens} \\ \hline 8 & \text{tens} \end{array}$$

Subtracting with tens and ones in subtrahend and minuend but without changing in ones column

Example: 125 - 62 = _____ tens _____ ones

$$\begin{array}{rcrlrl} 125 & = & 12 & \text{tens} & 5 & \text{ones} \\ -\ 62 & = & 6 & \text{tens} & 2 & \text{ones} \\ \hline & & 6 & \text{tens} & 3 & \text{ones} \end{array} \qquad \begin{array}{r} 125 \\ -\ 62 \\ \hline 63 \end{array}$$

Changing in Subtraction.--Since changing (borrowing) presents diffi-culty for a number of children, a sequence of steps and s[illegible] is presented to build an understanding of the process. I[illegible] trouble with subtraction, an analysis of his performance [illegible] steps may be helpful in identifying his difficulty and in [illegible] reteaching.

Money problems help children understand changing. This type of problem, however, should not be used to the exclusion of other types.

Example: 50¢ - 23¢ = N

$$\begin{array}{rcll} 50¢ & = & \overset{4}{\cancel{5}}\ \text{dimes} & \overset{10}{\cancel{0}}\ \text{pennies} \\ 23¢ & = & 2\ \text{dimes} & 3\ \text{pennies} \\ \hline & & 2\ \text{dimes} & 7\ \text{pennies} \end{array}$$

50¢ - 23¢ = 27¢

How can we subtract 3 pennies from 0 pennies? (By changing one of the dimes to pennies)

Why is the zero crossed out and the 10 written in its place?

Why is the 5 crossed out and the 4 written in its place?

After pupils have worked with several examples of money problems, they may try a more abstract problem which gives practice in changing a ten to ones.

Example: 55 - 37 = N

$$\begin{array}{rcll} 55 & = & \overset{4}{\cancel{5}}\ \text{tens} & \overset{15}{\cancel{5}}\ \text{ones} \\ 37 & = & 3\ \text{tens} & 7\ \text{ones} \\ \hline & & 1\ \text{ten} & 8\ \text{ones} = 18 \end{array}$$

55 - 37 = 18

Can we subtract 7 ones from 5 ones?

What must we do? (Change one of the 5 tens to 10 ones.)

When we do this, 5 tens 5 ones become 4 tens 15 ones.

Why do we cross out the 5 and write 15 above it?

Why do we cross out 5 and write 4 above it?

Through discussion and demonstration, an understanding of the changing process is developed. Pupils are then ready to shorten the form of writing the problem.

Example: 50 - 39 = N

$$\begin{array}{r} 50 \\ -39 \\ \hline \end{array} \qquad \begin{array}{r} {\scriptstyle 4\,10} \\ \cancel{5}\cancel{0} \\ -39 \\ \hline 11 \end{array}$$ (Check by adding 39 and 11.)

50 - 39 = 11

A hundred chart may be used to help pupils solve such problems as:

Jerry has 50¢. He spent a quarter. How much does he have left?

Mary has 50¢. How much will she have left if she spends 20¢? If she spends 25¢ how much will remain?

Joe wants to buy a knife which costs 50¢. He has 35¢. How much more will he need?

The skill of estimating to determine a sensible answer is developed through emphasis on problems similar to the which follows.

Problem: John has 98 cents. He wishes to buy a game which costs 47 cents. He thinks 98 cents is almost $1.00. The game costs 47 cents which is almost half a dollar. He estimates he will have about 50 cents left.

The following type of problem gives practice in subtraction of three-digit numbers involving changing a ten to ones.

Example: 860 - [illegible] = N

$$\begin{array}{r} 860 \\ -[illegible] \\ \hline \end{array} \qquad \begin{array}{r} {\scriptstyle 5\,10} \\ 8\cancel{6}\cancel{0} \\ -[illegible] \\ \hline [illegible] \end{array}$$

Change one of the tens to ones; then there are 8 hundreds, 5 tens and 10 ones.

Subtract the ones: 10 - 4 = 6

Subtract the tens: 5 - 2 = 3

Subtract the hundreds: 8 - 2 = 6

860 - 224 = 636

Practice in changing a dollar to dimes to show changing in the tens place is provided by the problem below.

Example: $6.29 - $2.43 = N

6.29 = 6 dollars 2 dimes 9 pennies

2.43 = 2 dollars 4 dimes 3 pennies

Change one of the 6 dollars to dimes.

6.29 = 5 dollars 12 dimes 9 pennies

2.43 = 2 dollars 4 dimes 3 pennies
3 dollars 8 dimes 6 pennies

Later shorten the form:

$6.19 - $3.88 = N

$$\begin{array}{r} \$6.19 \\ -3.88 \\ \hline \end{array} \qquad \begin{array}{r} 5\ 11 \\ \$6.19 \\ -3.88 \\ \hline 2.31 \end{array}$$

$6.19 - $3.88 = $2.31

The next step in difficulty involves practice in changing in both the tens and hundreds place, using money and other situations.

Example: $7.26 - $4.57 = N

$$\begin{array}{r} 1\ 16 \\ 7.26 \\ -4.57 \\ \hline 9 \end{array}$$

Change one of the dimes to pennies. You have 1 dime 16 pennies

$$\begin{array}{r} 6\ 11\ 16 \\ 7.26 \\ -4.57 \\ \hline \$2.69 \end{array}$$

Change one of the dollars to dimes. You have 6 dollars 11 dimes

Example: 504 - 156 = N

$$\begin{array}{r} \overset{4}{\cancel{5}}\ \overset{\overset{9}{\cancel{10}}}{\cancel{0}}\ \overset{14}{\cancel{4}} \\ -1\ 5\ 6 \\ \hline 3\ 4\ 8 \end{array}$$

Since there are no tens to change to ones, one of the hundreds must be changed to tens in order to be able to change a ten to ones for subtraction in the ones column.

504 - 156 = 348

Example: 600 - 239 = N

600 = 6 hundreds 0 tens 0 ones

239 = 2 hundreds 3 tens 9 ones

I must change the hundreds so I will have tens.

5 hundreds 10 tens 0 ones

I must then change the tens so I will have ones. This becomes

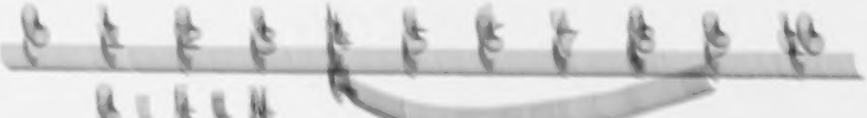
5 hundreds 9 tens 10 ones

$$\begin{array}{r} \overset{5}{\cancel{6}}\ \overset{10}{\cancel{0}}\ 0 \\ -2\ 3\ 9 \\ \hline \end{array} \qquad \begin{array}{r} \overset{5}{\cancel{6}}\ \overset{\overset{9}{\cancel{10}}}{\cancel{0}}\ \overset{10}{\cancel{0}} \\ -2\ 3\ 9 \\ \hline 3\ 6\ 1 \end{array}$$

Activities for Strengthening Skills.--Many of the activities suggested for increasing skill in addition may be adapted to include related subtraction facts. Some of the exercises listed below strengthen understanding of the relationship of the two operations. The use of any activity should be determined by the need of the pupil.

Number Line Activities:

Show the problem 9 - 5 on a number line.



9 - 5 = N
9 - 5 = 4

Work these on the number line:

18 - 9 = N
28 - 9 = N
A number 10 less than 100
A number 2 tens less than 100
A number 15 less than 70; a number 15 less than this number

Basic Facts Cards:

Pupils should make sets of individual addition and subtraction cards (2" by 3").

Front	Back
9 - 4 =	9 - 4 = 5

Vertical form should be used as well as horizontal.

Visitor:

Groups of facts are listed. A fact is included in each list which does not belong in the group. The pupil is to identify this fact.

4 + 5	7 + 2	6 + 3
5 + 4	9 - 7	6 + 4
5 + 5	9 - 2	9 - 3
9 - 5	2 + 7	9 - 6
9 - 4	7 + 3	3 + 6

Multiplication of Whole Numbers

The multiplication process is rather fully developed on pages 180-182 in the Intermediate Manual, Revised. Attention is directed to the need for opportunities for pupil discovery through the use of representative materials. Mastery of abstract facts should not be attempted until the meaning has been developed.

Concept of Multiplication.--Multiplication should be developed as combining a number of equal groups. There are many situations in the pupil's experience which call for the solution of this type of problem. For example, "Four children brought 3 cents for our Red Cross fund. How much does that make?" "Four boys and four girls dance together in a set. Three sets dance at a time. How many children dance at one time?" Objects, counters, the number line, the one hundred chart, and the counting frame should be used as needed.

Practice Activities.--The activities included are suggestions of additional ways to motivate the program and strengthen the skills.

The Distributive Property of Multiplication:

Think about this problem:

3 x 25 = N

Rewrite 25 as 2 tens and 5 ones, then:

3 x (20 + 5) = N
(3 x 20) + (3 x 5) = N
60 + 15 = N
75 = N

Work these problems by this same method:

3 x 33 = N
3 x 43 = N
3 x 34 = N

The Meaning of Multiplication:

Show the meaning of 3 x 4 with X diagrams.

4 shows the number in each row.
3 shows the number of rows.

x x x x
x x x x
x x x x

Show the meaning of: 3 x 6
6 x 3
4 x 9
9 x 4

Development of a Multiplication Chart:

Build a multiplication chart. Begin with the one in the left column. Multiply each of the numbers in the top row by 1. Example: 1 x 1 = 1; 1 x 2 = 2. Write the results in the proper spaces. Then multiply each of the numbers in the top row by 2, and so on.

X	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9						
4									
5									
6									
7									
8									
9									

Multiplication Facts Column:

Write the multiplication facts in the right column, using the chart, if necessary. Later, try it without the help of the chart.

0-9	10-19	20-29	30-39	40-49	50-59

Follow the Sign:

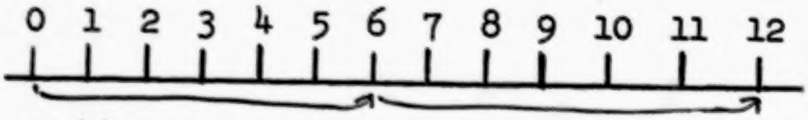
	x3	x9	x6
8			
3			
5			
4			

Do what the sign says.

Write your answer in the right space.

Number Line Activities:

Show the problem 2 x 6 on a number line. Two times six means to take 2 steps (from left to right), each 6 units in length.



Work these problems on a number line.

3 x 7 = N
6 x 6 = N
2 x 8 = N

Division of Whole Numbers

If the operations with subtraction and multiplication have been developed with meaning, most children will have the readiness for dividing. Opportunities should be provided for pupils to see division interpreted as:

The inverse of multiplication

A process of measurement

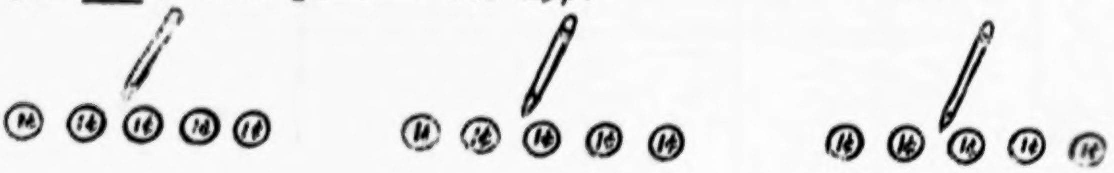
A process of partition

Successive subtraction.

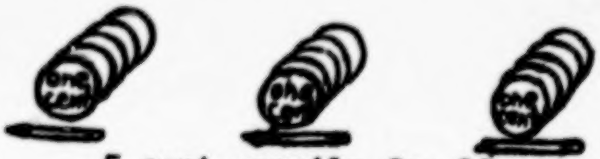
Development of the Division Concept.--Early instruction should involve situations requiring the use of small numbers.

Problem: Let's think of some ways to find how many 5-cent pencils you can buy for 15¢.

Jack made pictures of 15 pennies. Then he made a pencil for each 5¢. This shows that in 15¢ there are ___ groups of 5¢. He can get ___ 5-cent pencils for 15¢.

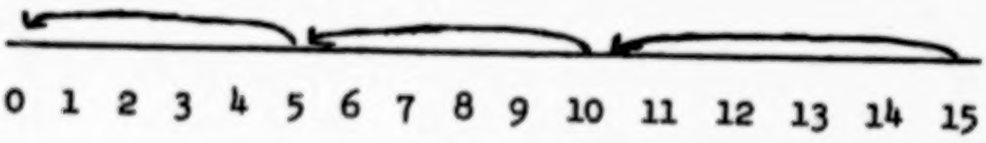


Mary put pennies in stacks of 5. Then she made a pencil for each stack.



She can get ____ 5-cent pencils for 15 cents.

Jim used a number line. He started with 15 and counted back 5. He drew a line to 10. Then he counted back 5 more. He drew a line to five.



His number line shows there are ____ groups of 5.

Sally began with 15¢ and subtracted 5 cents until she had nothing left. This is the way she wrote it.

$$\begin{array}{r} 15\text{¢} \\ -\ 5\text{¢} \\ \hline 10\text{¢} \\ -\ 5\text{¢} \\ \hline 5\text{¢} \\ -\ 5\text{¢} \\ \hline 0 \end{array}$$

She subtracted 5¢ _____ times.
She can buy _____ 5-cent pencils for 15 cents.

When you find how many groups of 5 are in 15, this is dividing 15 by 5. 15 divided by 5 is 3. We call this a division fact. We can write it 15 ÷ 5 = 3.

Problem: There are 35 seeds in a package. Mrs. Love's class wants to plant their seeds in ice cream cartons, 5 seeds to a carton. How many boxes will they need for one package of seed?

Will 2 cartons be enough; 2 x 5 seeds is 10 seeds.
Will 3 cartons be enough; 3 x 5 seeds is 15 seeds.
Will 4 cartons be enough?
______ x 5 equals 35 seeds.

Read this table and tell the missing numbers.

Cartons	1	2		4			7		
Seeds	5	10	15	20		30		40	45

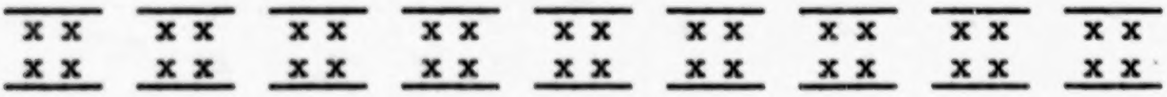
Complete this table:

5 = 1 five

10 = ____ fives

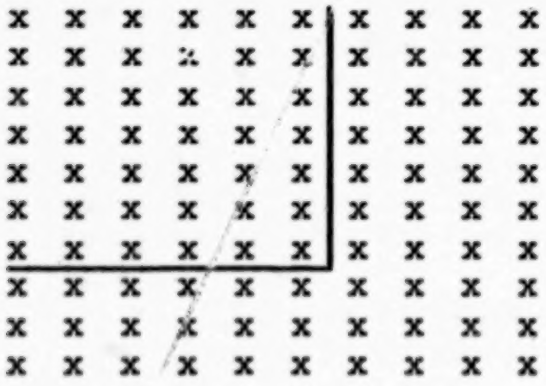
15 = ____ fives

Discovery of Division Facts.--Diagrams and charts using tokio-squared paper, x's, or dots are helpful in finding division facts. Examples of these follow:



Division Facts 4 as a Divisor	Fraction Facts	Division Facts Quotient 4	Fraction Facts
$4 \div 4 = 1$	$\frac{1}{4}$ of $4 = 1$	$4 \div 1 = 4$	$\frac{1}{2}$ of $8 = 4$
$8 \div 4 = 2$	$\frac{1}{4}$ of $8 = 2$	$8 \div 2 = 4$	$\frac{1}{3}$ of $12 = 4$
$12 \div 4 =$ ___	$\frac{1}{4}$ of ___ $= 3$	___ $\div 3 = 4$	$\frac{1}{4}$ of $16 =$ ___
$16 \div 4 =$ ___	$\frac{1}{4}$ of ___ $= 4$	___ $\div 4 = 4$	$\frac{1}{5}$ of $20 =$ ___

Duplicated hundred charts made with x's or O's are useful in helping pupils see groupings of equal numbers. By working with charts, such as those that follow, low achievers develop understanding of the division facts. For example, how many groups of six are in 42?



Helping Chart for Quotient of Six

x x x x x x $\begin{array}{r}6\\1\overline{)6}\end{array}$

xx xx xx xx xx xx $\begin{array}{r}6\\2\overline{)12}\end{array}$

xxx xxx xxx xxx xxx xxx $\begin{array}{r}6\\3\overline{)18}\end{array}$

xxxx xxxx xxxx xxxx xxxx xxxx $\begin{array}{r}6\\4\overline{)24}\end{array}$

Helping Chart for Divisor of Six

x x x x x x $\begin{array}{r}1\\ 6\overline{)\,6}\end{array}$

xxxxxx xxxxxx $\begin{array}{r}2\\ 6\overline{)\,12}\end{array}$

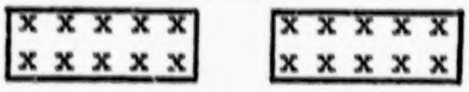
xxxxxx xxxxxx xxxxxx $\begin{array}{r}3\\ 6\overline{)\,18}\end{array}$

xxxxxx xxxxxx xxxxxx xxxxxx $\begin{array}{r}4\\ 6\overline{)\,24}\end{array}$

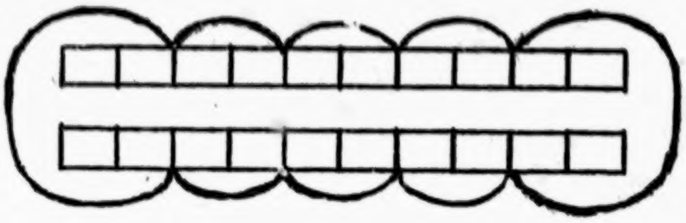
xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx $\begin{array}{r}5\\ 6\overline{)\,30}\end{array}$

Division of a Number into Equal Groups.--Many activities may be designed to help pupils visualize and discuss the concept of division into equal groups. Diagrams may be used to show how a number is so divided. Examples which follow are appropriate for inclusion in pupil arithmetic notebooks.

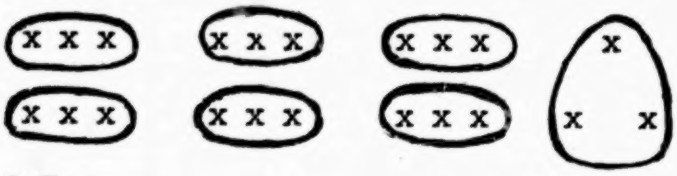
20 ÷ 10 = _____



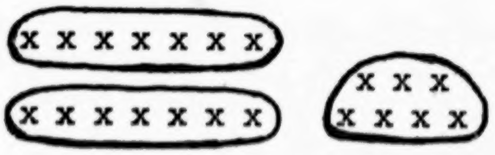
20 ÷ 2 = _____



21 ÷ 3 = _____

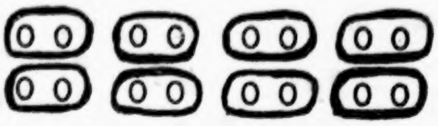


21 ÷ 7 = _____

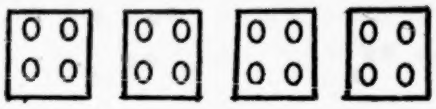


The activity which follows may be used to provide practice on basic division facts for any group. The 16 group is illustrated. Duplicated sheets of paper containing an arrangement of 16 objects are prepared. Since 16 objects could be divided into equal groups in 3 different ways (16 ÷ 4, 16 ÷ 2, and 16 ÷ 8) the sheet is divided into three parts. The activity may be started by having pupils circle as many groups of 2 as they can find in the section and writing the fact they have illustrated. They might then circle other equal groups and write the appropriate fact.

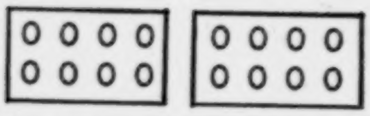
16 ÷ 2 = 8



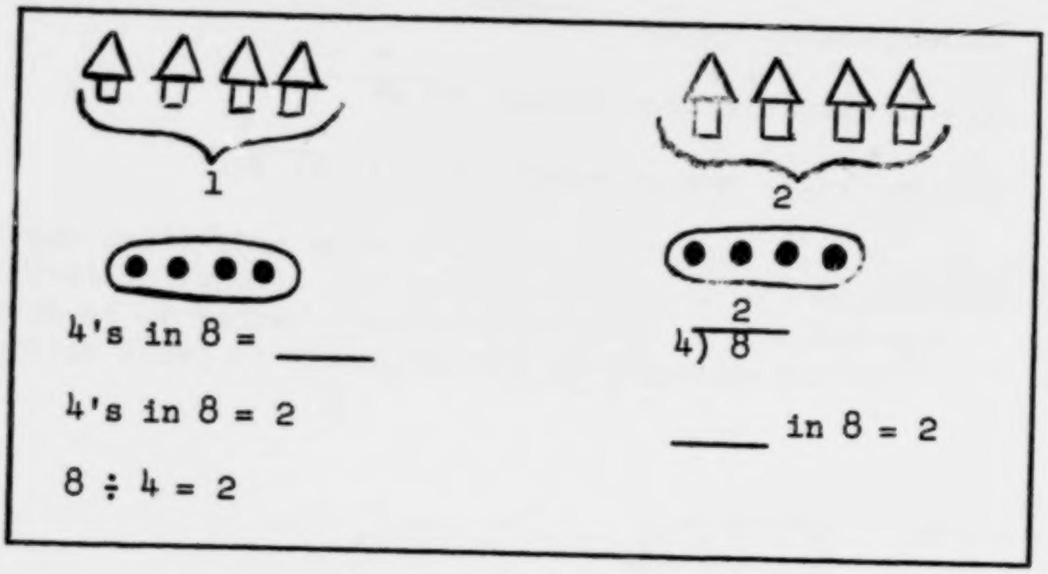
16 ÷ 4 = 4



16 ÷ 8 = 2



Pupil drawings or pictures from old books or magazines may also be used to illustrate this concept.



4's in 8 = ____

4's in 8 = 2

8 ÷ 4 = 2

$4\overline{)8}^{\,2}$

____ in 8 = 2

Practice with Uneven Facts.--Practice with uneven division facts is strengthened through the development and use of tables of facts for the different divisors.

For dividing by 4:

4	8	12	16	20	24	28	32	36
5	9	13	17	21	25	29	33	37
6	10	14	18	22	26	30	34	38
7	11	15	19	23	27	31	35	39

In the example 26 ÷ 4, the pupil thinks 26 cannot be divided evenly by 4. The table tells that 24 can be divided by 4. If the division facts are mastered, he automatically says 24 can be divided evenly by 4. Since 26 is two more than 24, there will be a remainder of 2.

The work sheet which is given below will give an indication of the pupil's mastery of facts as well as his ability to read and follow direction. An analysis of the pupil's performance will identify points of weakness and area for reteaching.

Work Sheet

Directions: Read carefully. Do as each statement tells you. Make sure to check your work.

1. Write the numbers from 1 through 72 on your paper (on the chalkboard). Leave a space between each number
   1 _ 2 _ 3 _ 4 _ 5 _ ....

2. Make a red circle around the numbers you can divide evenly by 8.
3. Make a blue circle around the numbers which will have a remainder of 3 when divided by 8.
4. Make a purple circle around the numbers which have a remainder of 1 when divided by 8.
5. Make a green circle around the numbers which have a remainder of 7 when divided by 8.
6. Put a black line under the numbers which have a remainder of 4 when divided by 8.
7. Put an x on the numbers which have a remainder of 2 when divided by 8.
8. Draw a line under the numbers which have a remainder of 6 when divided by 8.

Division of Larger Numbers.--Some examples requiring division of larger numbers are included in the Intermediate Manual, Revised, page 183. An additional example is included in this manual in order to show typical pupil thinking and verbalization. The teacher needs to provide exercises to fit individual or class needs.

Problem: How many tickets will each class get if 624 tickets are divided among two classes?

Two principles should be emphasized, the distributive property and division as successive subtraction. For example, in finding $2\overline{)\,624}$ the pupil should see the example as finding $2\overline{)\,600} + 2\overline{)\,20} + 2\overline{)\,4}$. The dividend is expressed as 600 + 20 + 4 and the divisor is distributed over the terms. The first step should be:

$$\begin{array}{r l} 2\overline{)\,624} & \\ \underline{600} & 300 \\ 24 & \end{array}$$

The pupil's thinking is: "My answer will be more than 300 since three hundred x 2 is 600. When I subtract three hundred 2's, the remainder is 24."

The pupil thinks, "Ten 2's in 20. If I subtract ten 2's, the remainder is 4."

The second step becomes:

$$\begin{array}{r l} 2\overline{)\,624} & \\ \underline{600} & 300 \\ 24 & \\ \underline{20} & 10 \\ 4 & \end{array}$$

The child thinks, "Two 2's in 4, subtract 4." The third step becomes:

```
2)624                                   2)624
  600  300                                600   (300 x 2)
  ---                    or               ---
   24                                      24
   20   10                                 20   (10 x 2)
   --                                      --
    4                                       4
    4    2                                  4   (2 x 2)
   --   ---                                --
        312
```

The following activities are helpful to children as they move into this work:

Counting by 10's and multiples of 10

Writing helping tables for certain divisors; for example:

1 x 21 = 21

2 x 21 = 42

3 x 21 = 63

Dividing by multiples of 10 or multiples of 100

Pupils are helped as the teacher guides them in:

Estimating a reasonable answer

Identifying the place value of each digit in the dividend

Understanding the reason for dividing from left to right

Determining the place value of the numbers in the quotient

Determining the number of places the quotient will have.

Verification of Answers.--Children should be taught to verify answers in a number of ways. They may:

State each step taken to find the quotient

Add as many times as specified by the quotient plus the remainder, if there is any

Multiply the divisor by the quotient, and add the remainder, if any

Interchange the quotient and the divisor and divide

Approximate the answer.

Appraisal of Pupil Understanding.--After a pupil has had instruction and practice in each phase of the division process, he should be able to demonstrates his skill in its use. An exercise similar to the one below tests understanding of the division process and computational skill as well:

What is the largest remainder you can have if you divide by 7?

What is the largest remainder you can have if you divide by 12? by 19? by 13? by 56? by 27? by 32? by 41? by 61? by 74?

How can you tell when to divide to find the answer to the question in a problem?

How could you use addition to answer the question in the example 18 ÷ 6 = ? Multiplication?

What is the sign that tells you to divide?

Give an example to show that you can divide 10's as you do ones.

If you forget the answer to the example 24 ÷ 4, you can find it best by using which of these multiplication facts (6 × 4 = ___, 4 × 6 = ___, 3 × 6 = ___)?

In a division example with a one-place divisor and a two-place dividend, the quotient will be either a ___ -place or a ___ -place number.

Practice Activities.--The activities which follow suggest additional ways to increase understanding of and skill in the use of the division process.

Number Line:

Show the problem 9 ÷ 3 on a number line. Division is shown by taking the steps from right to left.

Work these problems on a number line:

21 ÷ 3 = n

3 × 7 = n

Number Sentences:

Can you make number sentences for problems and show how you would work the problem?

Problem: Betty put her pencils in groups of 3's. When they were all together she had 9 pencils. How many groups of 3 did she have?

N x 3 = 9, 9 ÷ 3 = 3, 3 x 3 = 9, N = 3

1. Susie put 6 in each group. When she put her groups together she had 18. How many groups did she have?

2. I have 3 groups of the same size. I put them together and had 21. How many were in each group?

How Many Combinations Do You Know?

Write all the multiplication and division combinations which will have these numbers for answers.

12	16	25	45	36	27
		2 × 12½ 5 × 5 50 ÷ 2 100 ÷ 4			

Follow the Sign:

	÷8	÷4	÷2
72			
48			
32			
56			

Do what the sign says. Write your answer in the right space.

Fractions

Common Fractions

For the development of this topic, consult the Intermediate Manual, Revised, pages 184-185. Through discussions and questions, the teacher should determine the pupils' understandings of fractions. Extensive use should be made of manipulative materials in developing and reteaching ideas concerning fractions. Pupils should use manipulative materials and make diagrams as they make their discoveries and later as they check their solutions.

Sequence for Teaching Fractions.--The sequence suggested in Teaching Arithmetic for Understanding[1] will be helpful in planning the program:

Finding half of a whole

Finding half of groups of two, four, six, and eight, by grouping objects

---

[1] John L. Marks and Others, Teaching Arithmetic for Understanding. New York: McGraw-Hill Book Company, Inc., 1958.

Meaning of half an hour, half a pound, half a dollar

Vocabulary, such as numerator and denominator

Meaning of unit fractions to $\frac{1}{5}$

Writing fractions with symbols ($\frac{1}{4}$) and meaning of each number

Finding $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ of numbers

Concept of multipart fractions ($\frac{2}{3}$, $\frac{4}{5}$)

Changing fractions to equivalent fractions

Concept of fraction; two-thirds as two of three equal parts of one

Comparing quantities by means of a fraction

Adding and subtracting unlike fractions ($\frac{1}{2} + \frac{1}{3}$)

Extension of concepts of fractions to include improper fractions and mixed numbers

A fraction as meaning an indicated division or a ratio

Concept of common denominator

Extending concepts of fractions to include improper fractions and mixed numbers with unlike fractional parts ($2\frac{1}{3} + 3\frac{1}{8}$)

Relation of common and decimal fractions.

Understanding of Concepts.--As the teacher helps pupils explore with common fractions, the child may check progress by such questions as:

Could I arrange fractions from small to large or from large to small?

Could I write a whole number with a fraction?

Could I write a whole number with more than one fraction?

Can fractions be used to name points on a number line?

Can I add, subtract, multiply, and divide fractions?

Computations with Fractions.--Teachers should read carefully the Intermediate Manual, Revised, pages 185-189, for help in developing understandings of computation with fractions. In working with low achievers, it is particularly important to spend much time building understanding of each process. Pupils need many occasions to use representative materials to make discoveries about each step presented. Their discoveries should be recorded in an arithmetic notebook or other appropriate place.

As children work with addition of fractions, a carefully planned sequence should be followed. Suggested levels of development are:

Addition of like fractions, without carrying: $\frac{1}{8} + \frac{3}{8}$

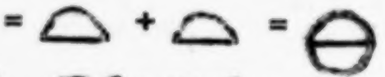
Addition of like fractions, with changing: $\frac{1}{2} + 3\frac{1}{2}$

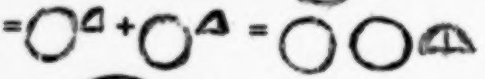
Addition of unlike fractions, with denominator in the same family: $\frac{1}{4} + \frac{1}{8}$

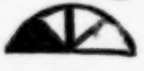
Addition of unlike fractions with denominators of different families: $\frac{1}{4} + \frac{1}{3}$

In working with subtraction of fractions, the sequential steps may follow the same order as those suggested for addition. The careful development of each step is necessary before a new one is introduced.

Multiplication of fractions is difficult for many pupils. The use of cutouts may help low achievers discover methods of working problems, such as those listed below.

$2 \times \frac{1}{2} =$ 

$2 \times 1\frac{1}{4} =$ 

$\frac{1}{4} \times \frac{1}{2} =$ 

The Intermediate Manual, Revised, pages 188-189, suggests materials and procedures for working more complex problems, such as:

$\frac{2}{3} \times \frac{1}{4} = N$

If low achievers in the sixth grade work with division of fractions, they need many occasions to build readiness and understanding before the rule, "invert the divisor and multiply," is discovered. Practice activities might include:

Showing how many times $\frac{1}{2}$ can be taken from 3, or any given number

Showing how many times $\frac{1}{8}$ can be taken from $\frac{1}{2}$

Showing how $\frac{3}{4}$ can be divided into two parts

Showing how many times $1\frac{1}{4}$ pies can be taken from $2\frac{1}{2}$ pies.

Activities.--Activities which give thorough understanding of the meaning of division of fractions are important. Some of these are listed under the following topics.

Measuring to Determine Equal Parts:

Questions which the teacher would ask might include:

If I wish to cut a piece of string in two equal pieces, where shall I cut it?

If I want to cut it in three equal pieces, where shall I cut it?

Will any of these cuts be in the same place?

If I mark a piece of string to cut it in two equal pieces and then mark the string to cut it in four equal pieces, will I have more than one mark at any point?

Other explorations of this nature should be tried using the number line or other manipulative material.

Using a Clock to Make Discoveries about Parts of an Hour:

Questions might include:

Where will the minute hand be in half an hour?

Color the part which the minute hand covered in a half-hour.

Into how many parts is the clock face divided?

Where will the minute hand be in a quarter of an hour?

Where will it be in another quarter of an hour?

Where will it be in three quarters of an hour?

Similar explorations may be made with other fractional parts of an hour so that thirds and sixths will be discussed. Shaded diagrams should be used to help pupils understand parts of a whole.

Writing Division in Fractional Form:

Possible exploration for the problem, eight divided by four, might include:

Can you write this statement without using words? One pupil might respond $8 \div 4 = 2$. Work for as many responses as possible.

$\begin{array}{r} 2 \\ 4\overline{)\,8} \end{array}$ $\qquad \frac{8}{4} = 2$

Where possible, help children to see that $8 \div 4$ could also be written $16 \div 8$, $8\overline{)\,16}$, $\frac{16}{8}$.

If the spirit of a game can be introduced, why not try:

$9 \div 3 = 12 \div 4$

$\frac{9}{3} = \frac{12}{4}$

$25 \div 5 = 50 \div N$

$\frac{25}{5} = \frac{50}{?}$

$16 \div 4 = 32 \div N$

$\frac{16}{4} = \frac{32}{N}$

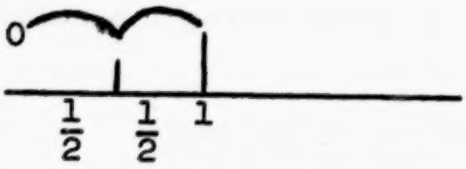
Using a Number Line to Show a Division:

The number line may be used to illustrate

$1 \div 2 = \frac{1}{2}$

$1 \div 3 = \frac{1}{3}$

$1 \div 4 = \frac{1}{4}$



This may be extended to help pupils recognize the comparative sizes of fractional parts.

Problem: Circle the pair of fractions which shows the largest jump.

$\frac{1}{4}, \frac{1}{2}$

$\frac{2}{8}, \frac{1}{2}$

$\frac{1}{5}, \frac{1}{3}$

Use the number line to help you find your answer. 0 will always be the starting point.

Which of the following will land you closer to 0 on the number line?

$\frac{1}{6}, \frac{1}{3}, \frac{2}{6}$

$\frac{3}{6}, \frac{1}{3}, \frac{1}{2}$

Use the number line to show which jump will land you farthest away from 0.

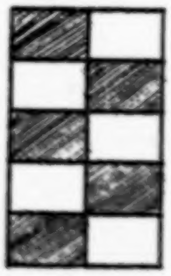
$\frac{1}{3}, \frac{1}{2}$

$\frac{3}{4}, \frac{6}{8}$

$\frac{2}{3}, \frac{4}{9}$

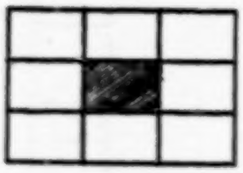
Making Designs to Gain Idea of Parts:

Pupils may experiment with shading designs on tokio paper and then write the numerals which express the idea in the pattern.



5 out of 10

shaded $\frac{5}{10}$



1 out of 9

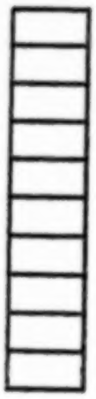
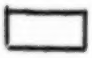
shaded $\frac{1}{9}$

Decimal Fractions

Decimals are introduced with children who understand the meaning of tenths as common fractions, and who understand place value in whole numbers. Low achievers need many occasions to use manipulative materials to visualize and build comprehension of both of the above meanings. They should be led to discover that decimal fractions are another way of recording fractions having a denominator expressed in tenths or multiples of tenths. Thus $\frac{9}{10}$ may be written .9.

Development of the Concept of Decimal Fractions.--The decimal concept can be introduced by reviewing with the children the analysis of whole numbers in terms of the position of the digits. For example:

Children's Words[2]

Compare  with  It is ten times as big.

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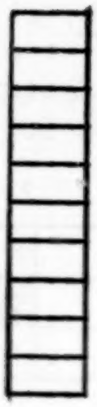
[2] J. R. Clark and L. K. Eads, Guiding Arithmetic Learning, p. 182. New York: World Book Company, 1954.

Compare with  It is one tenth as big.

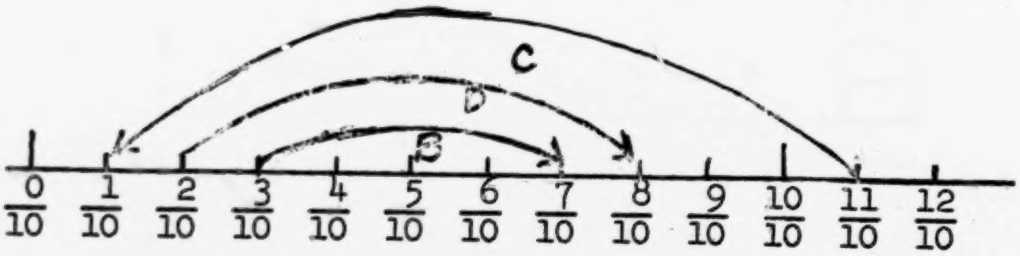
Relation of Common Fractions to Decimal Fractions.--The number line, fraction chart, odometer, ruler graduated in tenths and hundreds, squared paper, stop watch, and abacus are all effective aids for showing the relationship between common and decimal fractions. For example, have the children divide a large square into 10 equal parts. Label each part as shown below. Then have the children use the diagrams to make discoveries such as the following:

.1	.1
.1	.1
.1	.1
.1	.1
.1	.1

Common Fractions		Decimal Fractions
$\frac{1}{2}$	=	.5
$\frac{1}{5}$	=	.2
$\frac{2}{5}$	=	.4

Pupils who have used the number line as a way of learning about common fractions may be guided to think about a shorter way of writing fractions having a denominator of 10. The teacher needs to remember not to tell all but to encourage children to invent a shorter way of writing the fraction. They should be encouraged to invent some number line games of their own. An example follows:

Can you match the number sentence with the jump on the number line? Write the letter for the number line jump of the proper box.



☐ $\frac{3}{10} + \frac{4}{10} = \frac{7}{10}$

☐ $\frac{11}{10} - \frac{10}{10} = \frac{1}{10}$

☐ $\frac{2}{10} + \frac{6}{10} = \frac{8}{10}$

Make some number line jumps of your own and write the number sentences.

Can you see a shorter way to write certain fractions?

$.6 + .2 = .8$

$.7 + \underline{\quad} = .9$

$1.5 - \underline{\quad} = 1.0$

$.2 + \underline{\quad} = 1.0$

Did you discover anything about writing whole numbers in this way? Make number line jumps to show what is happening.

If $1 = \frac{10}{10}$, could we say $1 = 1.0$?

Try these for fun:

$2 = \frac{20}{10} = 2.0$

$3 = \frac{?}{10} = 3.0$

$4 = \frac{40}{?} = 4.0$

$10 = \frac{?}{?} = ?$

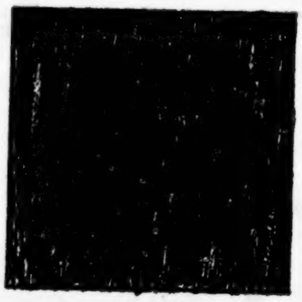
After the children discover the meaning of tenths, an exercise in which they write the missing number is appropriate.

.1, ____, .3, ____, .5, ____, .7, ____, .9, ____.

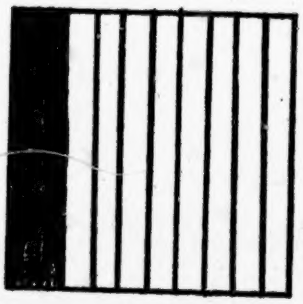
1.0, ____, .8, ____, .6, ____, .4, ____, .2, ____.

1.3, ____, 1.5, ____, ____, 1.8, ____, 2.0.

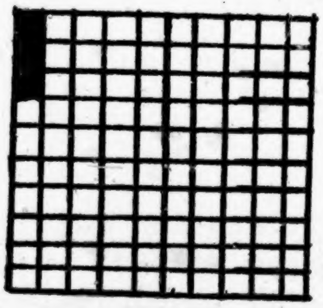
The use of squared materials will help to show the relative size of 1, .01, .001.



1.0



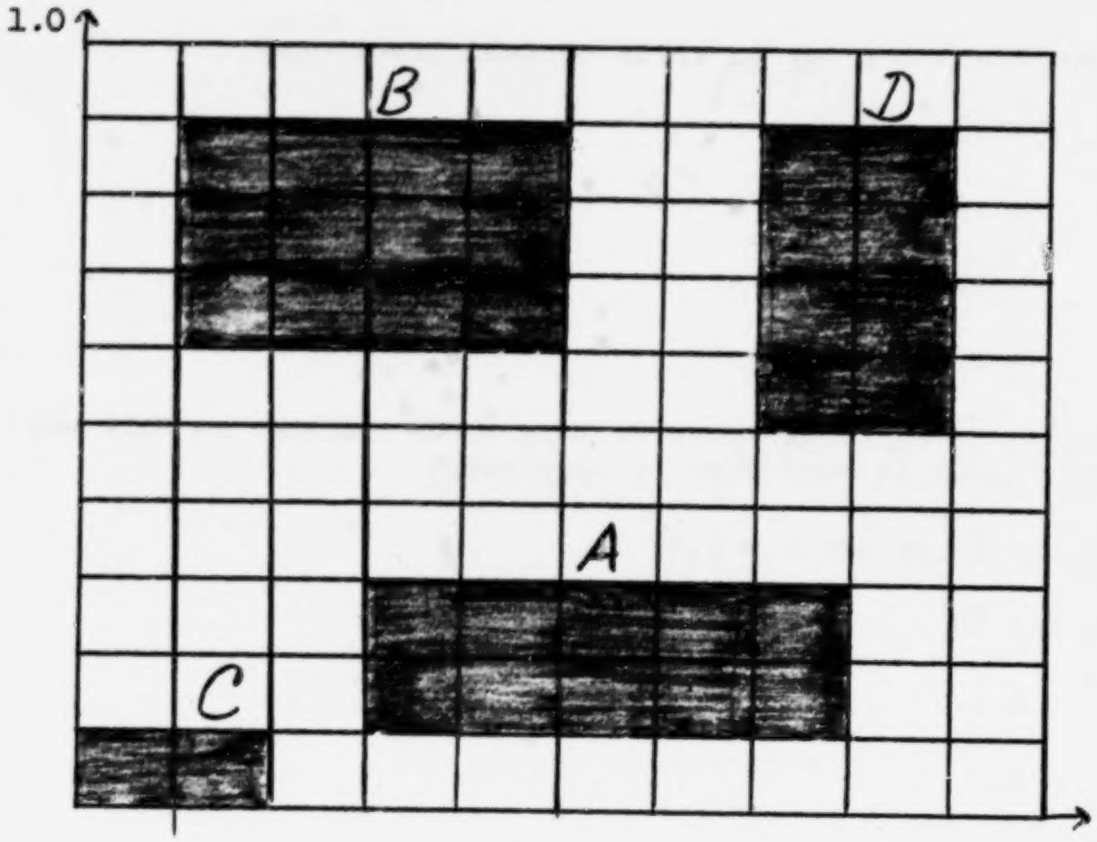
.2



.03

The number represented in the diagram by the use of squared material is 1.23. It is read as one and twenty-three hundredths.

Could you use a diagram to make some other discoveries? Write the letter of the diagram in the proper block.



☐ $.1 \times .2 = .02$

☐ $.12 \div .3 = .4$

☐ $N \times .4 = .12$

☐ $.3 \times N = .12$

☐ $.4 \times N = .08$

☐ $.4 \times .2 = N$

☐ $.2 \times .5 = N$

☐ $.2 \times N = .10$

Now make diagrams for these number sentences.

$.2 \times .5 = .10$

$.3 \times .6 = .18$

$.4 \times .5 = .20$

$.9 \times .2 = N$

$.7 \times .3 = N$

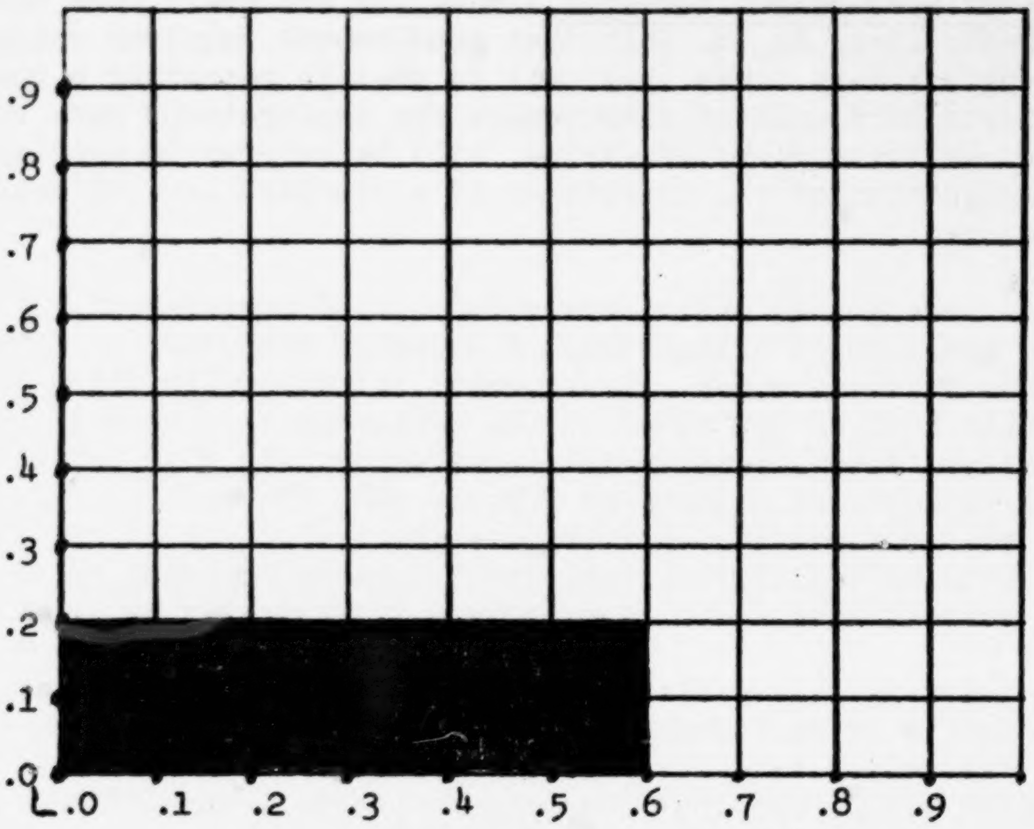
$.8 \times .5 = N$

$.6 \times .4 = N$

$.7 \times .8 = N$

Multiplication and Division of Decimals.--Pupils find the use of squared paper helpful in learning to multiply and divide whole numbers. It is equally valuable in teaching the process using decimals. A diagram can be used to develop the ideas $1 \times 1 = 1$, $\frac{10}{10} = 1$, $\frac{10}{10} = 1.0$. The shaded area shows:

$.2 \times .6$ or $\frac{2}{10} \times \frac{6}{10}$ or $\frac{12}{100}$



.2 x .6 = .12

We know 1 x 1 = 1; $\frac{10}{10} \times \frac{10}{10} = \frac{100}{100}$; and $\frac{100}{100} = 1$. We look for a short way to write a denominator of 100. If we write $\frac{2}{10}$ as .2, how could we write $\frac{12}{100}$?

Measurement, Graphs and Scale Drawings, and Geometry

Measurement

Measurement is important in the lives of all children and adults. Low achievers, like more able children, have had many common experiences, as buying such things as quarts of milk, which involve the everyday application of measurement. Its practical use in daily living affords further motivation for measurement. Review and practice using the fundamental operations can be more meaningful when measurement situations form the basis for the work.

Low-achieving children should work toward accomplishing the following ideas concerning measurement:

Familiarity and facility in the use of common standard measuring units

The idea of associating a number with an object through comparison with a selected unit

Changing from one unit of measure to a different unit of measure

Estimation.

Development of Measurement Concepts.--Many low achievers have not developed such basic ideas as the fact that measurement requires choosing a unit and finding how many times that unit is used in measuring a quantity. The use of a non-standard unit of measurement for exploration, such as a pencil, a crayon box, or a piece of string, will be helpful in gaining these ideas. Recognition of the importance of a standard unit of measure can then be developed.

After pupils have gained basic understandings of measurement, they should have many experiences using standard units of measurement. They must be taught how to use a ruler. Measurement situations in which they use the actual unit must be contrived so the measurement facts will be developed naturally. Actual measurement experiences help them establish such facts as 12 inches make a foot and 2 pints make a quart. If the arithmetic text does not provide appropriate, meaningful opportunities for teaching other units of measurement, the teacher needs to identify such situations from current events and to prepare a file of such material.

Research concerning the development of measurement and the establishment of standard units is as fascinating to these pupils as it is to more able children. The source material should come from books written at a reading level which can be handled. Such books can be secured from the supplementary book list or from the public library.

Sequence for Teaching Measurement.--While class needs and interests will dictate time for teaching certain kinds of measurement, a sequence is suggested. Work with length, weight, capacity, and temperature have practical aspects and can help pupils see practical uses for arithmetic.

Changing to larger or smaller units of measure is not too difficult for pupils when they have an opportunity to work with physical representations of the unit and gain the idea of common equivalents. Pupils should have much experience in making conversions. Many problems should be developed which will require a decision as to the computational process required. Selection of the appropriate level of vocabulary for these problems is important. Opportunities for conversion of smaller units to a larger unit, as pints to quarts, or larger units to smaller, as feet to inches, should be included.

Graphs and Scale Drawings

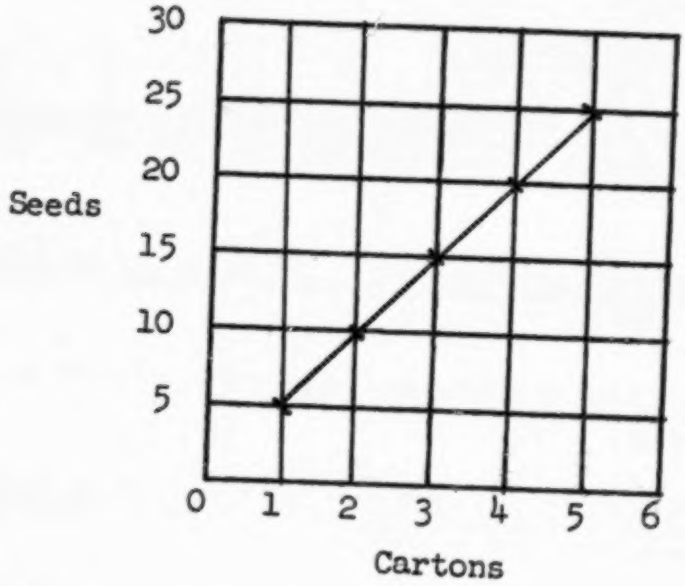
Topics rather closely related to measurement include scale drawings and graphs. Reading, interpreting, and constructing these visual representations of quantitative relationships help children to see their importance from the standpoint of social utility.

Scale Drawing.--The ability to interpret scale drawings is more important than constructing them. Pupils need to learn that the subdivisions on the scale represent a certain distance or amount. Experiences should be provided in measuring distances on a map using the scale given in the key.

Occasionally, pupils may be motivated to make a scale drawing. For example, if the school community is included in an orientation unit, a scale drawing may be indicated. Orientation concerning direction, preservation of shape, and knowledge of the units substituted should be emphasized.

Graphs.--Bar graphs, line graphs, and picture graphs are meaningful ways of helping low achievers chart their own progress. Simple graphs are useful in helping pupils understand the idea of pairs of numbers which represent rates. Pupils might build simple graphs of problems which contain related number pairs. For example, in the section on division, a problem was listed which required pupils to determine how many cartons were needed to plant a given number of seeds, five seeds to the carton. With teacher help, pupils may record this information on a simple line graph.

Seeds	5	10	15	20	25
Cartons	1	2	3	4	5



Geometric Forms

Opportunities should be provided for pupils to explore informally with some of the standard geometric forms and shapes. They should work with plane shapes, such as triangles, squares as special kinds of rectangles, rectangles, circles, and ellipses, and with the common solid forms, such as cubes, spheres, rectangular solids, cylinders, and cones. The idea of parallel lines and right angles or square corners should also be taught. Pictures, models, and illustrations from everyday living will help pupils gain familiarity with these shapes and forms.

In introducing work on perimeters, the teacher should make no attempt to develop the rule until pupils have been given many experiences in finding the distance around a plane figure through the measurement of its lengths. Since many of the textbooks begin with the rule, the teacher will do better to introduce the topic and develop it with the children before they use the textbook. Low achievers may not develop the formula for finding perimeter until as late as the sixth grade. Much work will have been done with perimeter in Grades Four and Five, with emphasis on meaning rather than rote use of a formula.

If fifth-grade pupils are ready, teaching the meaning of area should be introduced. This should be accomplished with emphasis on the concept of area rather than on computation without meaning. Computation other than counting the units should not be attempted at this time. After much work with counting the number of square units, pupils may be led to help the teacher state a rule, i.e., the number of square units per row multiplied by the number of rows gives the area. Still later this may be shortened to the form--length times width equals the area of a rectangle.

While low-achieving intermediate pupils will learn to identify some of the more commonly used solids, many of them will do no work involving computation. Occasionally, a science activity will motivate a group of these pupils to want to learn to compute the volume of a rectangular prism. When this occurs, help should be given.

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CHAPTER VI. SCIENCE

An Appropriate Science Program

In science teaching, the problem of adapting content and materials to the limitations of the low achiever may be somewhat different from that in other areas. Children tend to respond to the subject matter of science since it is closely concerned with things in which they are most interested--objects and happenings in the world about them. In addition, science lends itself to the use of concrete materials in exploring new ideas, and to experiments that make learning satisfying.

The science program for low achievers has been developed so that it will contribute to the attainment of the general purposes of science teaching; so that it will develop some phase or phases of the major science concepts; and so that it will be appropriate to both the limited learning capacity of these children and the way they learn.

The units developed later in this section illustrate techniques and learning activities appropriate for pre-fourth grade low achievers. Fourth-, fifth-, and sixth-grade units, presented in the science section of the Intermediate Manual, Revised, should be similarly adapted to the interest and ability potentials of low achievers in those grades.

Suitable Objectives

At the core of any program is the clear definition of the goals to be attained. Teachers, themselves, must have a thorough understanding of the goals. They must define the goals in sufficient detail so that children are able to understand them and learn to accept them. The objectives toward which the science program for low achievers is directed are:

To help children develop skills of problem solving

To help children develop attitudes consistent with the methods and content of science

To help children organize their knowledge around basic science concepts

To help children develop a sense of responsibility for the wise application of science to modify and control their environment.

These objectives may be achieved by helping the child learn to:

Frame questions that will help in gaining information that is accurate and pertinent to a problem

Look closely to observe similarities and differences

Determine how much something changes by comparing it with a similar thing that has not changed

Use simple laboratory techniques in experimentation

Generalize about cause-and-effect relationships and check the generalization with authoritative sources

Plan and complete simple records of observations in ways that are helpful in sensing relationships

Recognize the value of repeating experiments a sufficient number of times in order to establish a sound basis for generalizations

Withhold judgment and revise ideas as new evidence is presented

Organize knowledge within the framework of the broad, integrating generalizations of science

Look for the application of science principles that have been discovered.

General Techniques

In addition to the general techniques listed in the introductory chapter of this bulletin, the following techniques are suggested as effective ways of working with the low achiever.

Cultivate a classroom atmosphere that will encourage children to ask questions, discuss them, and to look for ways of finding possible answers.

Arouse in the children, through discussion and questioning, a need for and an interest in experimenting as a basic way of finding out things.

Make sure that the children know exactly what they want to find out and have a clear idea of what procedures to follow.

Give the children every opportunity to suggest approaches, methods, and materials for activities or experiments.

Make sure that the activities or experiments which the children do are simple enough to be performed in a comparatively short time and with a comparatively limited background of information.

Greet hasty conclusions with, "Are you sure of your facts?" Or, "How do you know that this is reliable?" Or again, "How can we find out?"

Help the children learn the techniques of recording observations and findings in written form by means of work sheets, diaries of events or day-to-day happenings, diagrams, pictures, and simple graphs.

Encourage the children to record the results of their investigations in their own ways or in their own words.

Give children practice in skills needed to construct equipment (the proper use of the hammer, saw, screw driver, and other tools) and in the skills needed to make simple measurements.

Specific Techniques

Whenever possible, investigations should be child-centered. Some, however, because of safety factors, complexity, or the nature of the investigation, should be initiated and directed by the teacher.

Initiating a Problem.--Problems may be initiated by the children or the teacher in many ways. Situations which define problems initiated by pupils and teachers are described below.

The child becomes the problem-maker when he is stimulated by sensory experiences to ask the "how," the "why," and the "what" type questions. For example, "How long does it take a tadpole to change into a frog?" Or the question might be, "What is an air-car?" Again, "If a bat can fly, why isn't it a bird?"

The teacher becomes the problem-maker when he confronts children with a situation for which they have no ready-made answer. For instance, "How can you move the objects on the table without touching them in any way?" "What do these seeds need in order to begin to grow?" Or, "Can you figure out a way to remove this inverted glass of water without spilling it on the table?"

Solving a Problem.--A pupil's ability to solve problems will increase if he is involved in:

Planning and performing experiments

When children are involved in setting up problems, making careful guesses, and testing their ideas with experiments, they are helped to arrive at plausible explanations and solutions, or answers, to their questions about their environment. In carrying out an experiment, all but the one variable to be tested are controlled in order to determine its relationship to the others. The experiment is repeated a sufficient number of times to provide reliability. Relationships are observed and, where possible, precisely measured. Tentative conclusions are drawn, and future investigations are planned. A good experiment often presents new questions to be studied.

Making careful observations of phenomena and keeping accurate records

These activities will enable children to classify, associate, or combine. Children are then in a better position to visualize the scene as a whole and to arrive at a logical conclusion. The data collected may be interpreted through charts, graphs, or tables.

Reading textual material to find answers to questions.

The use of reference materials is a major technique in developing research skills. Not only will it serve as a tool for gaining information from an authority but it will support what children have learned about setting up problems, establishing tentative hypotheses, testing hypotheses with experiments, and drawing valid conclusions.

Reading Science Materials.--Children with limited reading ability can still have a wide variety of reading experiences. There are a number of ways of adjusting the reading task to varying levels of ability. Among the most important is a careful selection of materials which are not too easy or too difficult. Second, it is possible through preliminary discussion to raise questions, outline problem areas, or lay plans for securing needed information so that the reading task is made clear and definite. Third, a pre-reading survey of the types of information children can find in dictionaries, encyclopedias, supplementary books, special reference books, newspapers, and periodicals should be made. When necessary, the children should be shown how to use indices and tables of contents. Finally, the children may need guidance in learning how to read materials which relate to the topics of their concern. This involves developing the following skills and techniques:

Seeing relationships between facts and ideas

Distinguishing between sentences that state general ideas and those that provide supporting detail

Applying ideas gained from reading

Drawing conclusions

Evaluating evidence.

Developing Vocabulary.--The teacher's major responsibility in developing science vocabulary is to help the children build clear concepts of the meanings of words. This can be done by:

Having pupils use the dictionary to clarify the particular science meaning

Using the special vocabulary in several varying contexts

Displaying the words in a prominent place so that the children can refer to them when necessary.

Assembling Materials for Experimentation.--The "doing" part of science gets under way best when there is a box of materials that may supply the needs of children as they plan a specific science experience. Such materials may be gathered by the teacher and the children from the community or purchased from a scientific supply house. Each school has a list of approved science materials. In addition, certain basic materials as screw drivers, hammers, pliers, an assortment of bottles, jars, and dishes, a few dry cells, and wire should be available for children to use at any time.

Using a Bulletin Board.--The bulletin board is a flexible teaching aid. It may be used to:

Introduce and create interest in a new unit of study

Give information on current science news

Display science vocabulary

Instigate lively discussion

Provide for individual and group responsibility in gathering and arranging materials

Improve the appearance of the classroom

Illustrate and summarize science concepts.

Culminating Activities.--Culminating activities should have two major purposes. First, they should summarize the learnings that children have achieved. Second, they should give pupils some incentive to go on from the questions and problems in which they have gained a measure of understanding to new and broader problems. Many of the activities listed toward the end of the units can be adapted for this purpose. Simple written reports, science exhibits, demonstrations, a science play produced by the children, and exhibits of children's hobbies are some examples of culminating science activities. Regardless of the form it takes, the culminating activity must be directly related to what the children have been studying. The pupils, the teacher, and everyone concerned must be fully aware that the activity is the result or by-product of science investigations the class has been doing.

Evaluating Progress

Evaluation, an integral part of teaching, begins with the statement of objectives. At all times, the teacher as well as the children must have a clear understanding of the objectives. After the objectives are established and made clear to all concerned, an appraisal or decision can be made about the children's progress, the program, and the effectiveness of teaching procedures.

Techniques.--An effective program of evaluation which measures progress toward an objective includes:

Observation of children's developing skills, attitudes, and behavior patterns both in situations arising naturally from pupil activity and in situations contrived by the teacher specifically for evaluation. These observations should be recorded in anecdotal forms, rating scales, or on check lists. An example of such a check list follows:

SCIENCE CHECK LIST AND EVALUATION CHART

Name________________________________ Teacher____________________________

		Unit I	
Expectations	Always	Sometimes	Seldom
General Skills			
Asks sensible questions			
Sees there is more to learn			
Thinks before speaking			
Experimental Skills			
Observes carefully similarities and differences			
Plans and completes simple records of observation			
Repeats experiment in order to establish a sound basis for generalizations			
Sees how information is related to major science generalizations			
Withholds judgment and changes ideas when new evidence is presented			
Checks ideas with authoritative sources			
Sees how something changes by comparing it with something that has not changed			
Uses basic tools carefully			
Uses what is already known to find something new			
Applies what is known to new situations			
Research Skills			
Reads selected materials			
Recognizes important ideas			
Uses indices and tables of contents			
Selects information on a single topic			
Understands pictures and simple charts			
Uses dictionary			
Summarizes in own words			
Related Skills			
Practices safety			
Uses simple measures			
Realizes that measuring is a basic science skill			
Can give simple oral reports			
Can write simple reports			
Others			

Analysis of the work of individuals and groups: collections, experiments, projects, and reports evaluated in terms of organization and classification of materials, creativity in and clarity of thinking, accuracy of information, appropriateness of explanations, and the resultant generalizations. For this purpose, the teacher may wish to use a form similar to the one which follows.

Report on__________

Basic Problem:

Approach to Studying Problem:

Organization of materials _____
Classification of materials _____

Progress Made:

Creativity in thinking _____
Clarity of expression _____
Accuracy of information _____
Appropriateness of explanation _____

Difficulties Encountered:

Ways to Help:

Conclusions:

Appraisal:

Essay tests constructed to provide a problem to solve, which first requires the necessary information and then allows scope in which to show how well the information can be applied. For example, "Suppose you are lost. But you know that the road you should take is to the east of you. How can you use a compass to find which way to go?" The pupil would need to show knowledge about applications of science principles in order to answer the question adequately.

Objective tests that measure broad understandings, reasoning, and judgment rather than retention of isolated facts. Some examples of objective test items are presented below.

1. Is the following statement true or false? Write T or F in the blank space.

   Plants need food, water, soil, and air in order to begin to grow. _____

2. Check the statement that best answers the question.

Why is air important?

_____ You can feel moving air.
_____ Air is always with you and around you.
_____ Air fills all space in our world that is not occupied by something else.

3. The air we live in is always changing. What is it about the air that is changing? Write the most appropriate word in the blank spaces.

blowing   water vapor   pressure   temperature   water
wind direction

The _________ of the air is always going up or down.

The _________ is always _________ stronger or weaker.

The _________ of the wind is always changing.

The amount of _________ in the air changes, and this makes the air drier or damper.

The _________ of the air is always increasing or decreasing.

Criteria.--Questions such as those that are stated in the Intermediate Manual, Revised, page 209, will aid the teacher in appraising the effectiveness of his science program.

Resources for Learning

To teach science, teachers need clear specific objectives, sound teaching techniques, and methods of evaluation. They also must have resources upon which they can draw as they carry out their program. The following list of resources is recommended for this purpose.

Printed Materials.--An important resource for teaching science is well-chosen, printed materials. The materials must be within the grasp of the children. They include dictionaries, encyclopedias, supplementary books, special reference books, newspapers, and periodicals.

Approved supplementary texts and general teacher reference books are listed in the Supplementary Book Lists which indicate the grade and reading levels of the books. These books may be examined at the Professional Library of the Cincinnati Public Schools.

Pictures and Magazine Articles.--A file of pictures and science articles from papers, leaflets, and magazines may be assembled by the teacher and the pupils. These materials are a valuable asset to the science classroom.

Excursions and Audio-Visual Aids.--In teaching science, there is a need for a variety of experiences. Trips and audio-visual aids allow pupils to enter into many direct experiences in areas where they have had no previous personal relationship. In addition, such activities may be used to widen and to deepen a whole area of study for children. A further value of the experiences is their use in verifying what children have learned in the classroom. Needless to say, preparing for their use and planning their place in a unit require thorough attention. A card file of such resources is a useful tool. It should include what is to be seen and what can be learned.

Resource Persons.--Resource persons bring an authoritative word on a specific problem which the children are studying. Below is a list of considerations designed to make the visit of such resource people successful.

Develop a list of ideas that the children want to discuss with the resource person.

Help the resource person make his information clear to the children.

Make sure the children know the purpose of the visit and are ready to learn what is presented.

Limit the material which the resource person is going to present. It should fit into the work of the class.

Animals and Plants.--An experience-centered science program makes it highly desirable that living things be brought into the classroom. Before plants and animals are brought into the classroom, the teacher and the children should study the requirements of living things, plan where they should be kept, and make provisions for their care. Many of the resources for teachers listed in the bibliography provide suggestions for the construction of aquaria, terraria, and cages for the care of living things.

Science Tables.--Children should feel free to bring in materials which they wish to show or about which they are seeking further information. The science table should be a place of activity and change. The materials displayed should never be allowed to remain on the table so long that their interest value is lost.

Unit Organization

This section deals primarily with science teaching in a pre-fourth grade class situation. However, the techniques presented would be profitable used with low achievers in all intermediate grades. The teacher approaches each topic through the interests and background of the children. He stresses the discovery method by which children conduct investigations and read materials in their search for answers to questions and for unifying "threads" which help them organize science information.

Process goals, basic concepts, and investigations with suitable activities are suggested for each unit. The concepts of each unit are a part of and contribute to the development of major science generalizations.

The teacher should review and extend pertinent concepts developed in other grades or other units. On page 210 of the Intermediate Manual, Revised, the units are listed in the recommended order of presentation.

Books listed in the bibliography in the Intermediate Manual, Revised, page 211, contain excellent information for all units.

The science experiences are grouped into the following units:

Magnets and Their Uses

The Air Around Us

The Earth's Resources

The Growth of Living Things

The unit, "Magnets and Their Uses," has been written in great detail to provide a concrete illustration of unit development with low achievers.

Concepts and Major Generalizations

THERE ARE MANY FORMS OF MATTER WHICH, UNDER ORDINARY CONDITIONS, CAN BE CHANGED BUT NOT DESTROYED.

Air has weight and exerts pressure.

Air is a mixture of invisible gases, minute solid and liquid particles.

Air is found in every space on earth that is not otherwise filled.

Air expands when heated and contracts when cooled.

Air is used by man in many ways.

The earth is composed of many materials that can be used by man.

Materials can be removed from the earth in various ways.

Materials have certain properties that make them useful.

Materials have certain characteristics which make them similar to or different from other materials.

New materials can be made by combining others in a specific way.

It is important to conserve our natural resources.

THERE ARE MANY FORMS OF ENERGY WHICH, UNDER ORDINARY CONDITIONS, CAN BE CHANGED BUT NOT DESTROYED.

Magnets exert force, either push or pull.

Magnets can be made of some substances only.

Magnets have many uses.

THERE IS AN INTERCHANGE OF MATTER AND ENERGY BETWEEN LIVING THINGS AND THEIR ENVIRONMENT.

Living things have different types of requirements necessary for the maintenance of life.

Plants grow in many ways.

Animals change as they grow.

A Teaching Unit: Magnets and Their Uses

This unit deals with some of the basic principles of magnetism. It builds on and extends what children have already studied in other grades. Although natural magnets and compasses have been used for centuries, little is actually known about the precise nature of the force of magnetism, even today.

Concepts

Magnets exert force, either push or pull.

Magnets can be made of some substances only.

Magnets have many uses.

Skills to Be Emphasized

In developing the above concepts through carrying out the experiences of this unit, the following ways of working in science seem especially important:

Learning to observe carefully

Learning to keep simple records of observations made in the study of magnets

Learning to organize and classify information

Developing an experimental approach to determine the behavior of magnets

Learning to draw tentative conclusions from observations and experimentation and to check them with authoritative sources

Learning to project understandings gained from simple investigations to more complex problems.

Investigations

Introduction.--Initiate this unit by asking the unit question, "How do magnets work?" Before the children can answer this question, they must know the meaning of the word "work" as a scientist would use it. Let the children tell what they think the word means. Then help them check their ideas with authoritative sources such as dictionaries and textbooks. Finally, help them select the scientific meaning. (Scientists use the word to indicate that something is being pushed or pulled.) Explain to the children that because a magnet attracts magnetic materials, scientists say it exerts force. This means it pushes or pulls.

Show the children the marked poles of a bar magnet.

How do they act when like poles are brought together? Unlike poles?

Let pupils feel the force a magnet exerts when it pushes or pulls by having them first bring the like poles together, and then the unlike poles.

Develop the meaning of the words attract and repel.

Materials.--Assemble several sets of the following materials so children can work in small groups. In this way, more pupils can participate in the experiments. The class will need magnets of various shapes, including U-magnets, horseshoe magnets, and bar magnets; iron filings; magnetic and nonmagnetic materials, such as tacks, paper clips, steel pins, steel darning needles, iron nails, pieces of paper, wood, rubber, leather, plastic, aluminum; thread or string; and the like.

Vocabulary.--The special vocabulary should be developed in a variety of contexts. The children should be encouraged to use the words in their explanations or in other activities. The words magnetic, nonmagnetic, attract, exert, force, and repel are often used in this unit.

Activities.--Help pupils find out how magnets work by engaging in the following activities.

What materials do magnets attract?

Place a large iron nail or any other iron or steel object on a nonmetallic surface. Ask the children if they can suggest a way to move the object without touching it, blowing it, or tipping the surface in any way.

After the pupils have exhausted their ideas, have a child move the object some distance with the magnet.

Lay other objects on the surface, including some that are magnetic and some that are not. Ask the children which materials the magnet will attract. If some children are uncertain, have them try each material.

Write Magnetic and Nonmagnetic on the board as headings of two lists. Members of the class should then list the materials they have found to belong to one list or the other. When they have finished, ask if they know one thing that is true of all the magnetic materials with which they have experimented. (The materials are made of iron or steel.)

Through what materials will the force of a magnet pass?

Ask the children to show that a magnet exerts force.

Inquire if they can see a magnet's force. Although we can't see the force of a magnet, we can see what it does. To demonstrate this, the children will need bar magnets, U-magnets, horseshoe magnets, a sheet of paper or thin cardboard, and some iron filings. (Write a list of the materials on the board.)

Instructions, such as the following, may be written on the board or on a work sheet.

Lay a bar magnet flat on a table.

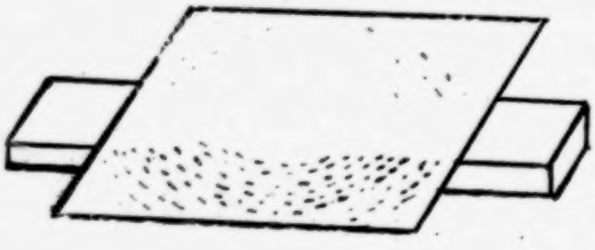
Cover the magnet with a thin cardboard or paper.

Sprinkle iron filings on the cardboard evenly.

Shake or tap the cardboard lightly.

When the class has carried out the instructions, help them use the expression, lines of force, as they talk about what happens. Stress the fact that one pole of a magnet attracts the other, as shown by the lines of force running from pole to pole.

Each child should make a drawing of a bar magnet's line of force, those of a U-shaped magnet, and the lines of force created when the poles of two bar magnets are placed close together.



Help the children summarize the "big ideas" they have discovered about how magnets work. A good way to do this is suggested below.

Have the children examine a bar magnet. Point out that one pole is marked N and the other is marked S. Have small groups do the following experiment.

Each group will need two bar magnets and a one-foot length of thread or cord. (Give the children the thread or cord and let them measure off one foot.)

Label the magnets (1) and (2)

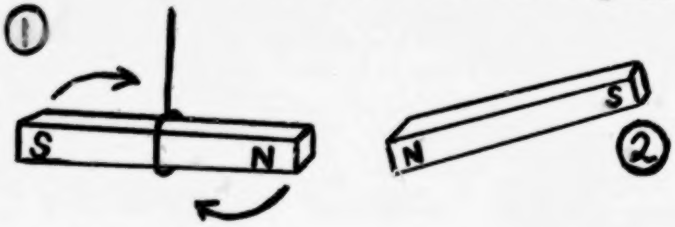
Suspend magnet (1) so that it will swing freely. Be sure no other magnet or magnetic materials are near. Let the magnet (1) turn until it comes to a rest.

Bring the N pole of magnet (2) near the S pole of magnet (1). What happens?

Bring the N pole of magnet (2) near the N pole of magnet (1). What happens?

Bring the S pole of magnet (2) near the N pole of magnet (1). What happens?

Bring the S pole of magnet (2) near the S pole of magnet (1). What happens?



Let the children make a chart with three columns. For example:

Magnet 1	Magnet 2	What happened?
N pole	S pole	
N pole	N pole	
S pole	N pole	
S pole	S pole	

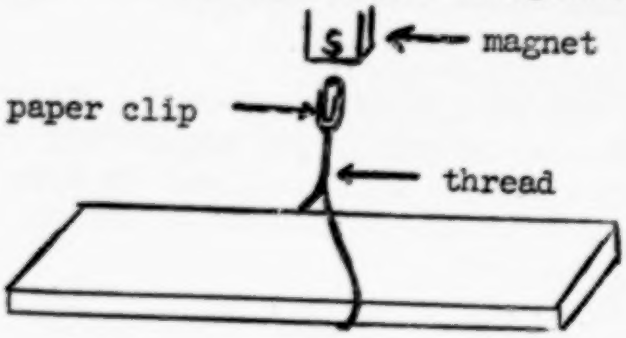
In the third column write "attract" or "repel," whichever you observe.

Suggest that the children try the experiment with a horseshoe magnet or a U-shaped magnet.

Bring the groups together. Write on the board, The Law of Magnets. Have the children use their charts to complete the statement: Unlike poles __________ and like poles ________. This is called the Law of Magnets.

Extending Activities.--Help the children discover that the force of a magnet works through air and other materials.

Have pupils tie a paper clip to one end of a thread about ten inches long. Secure the other end of the thread, using a thumbtack or tape, to a flat surface. With one hand, hold a magnet near enough to the paper clip to cause the clip to rise and nearly attach itself to the magnet. Slowly raise the magnet until the paper clip is suspended upright on the thread.



With the clip in this position, carefully hold a piece of paper between the clip and the magnet. Repeat this with other materials, such as a piece of plastic bag, aluminum foil, and cloth. Ask what these experiments show about magnetism.

See if the children can think of a way of comparing the strength of their various magnets. If necessary, give them a box of tacks and suggest that a certain amount of magnetism is needed to pick up and hold each tack. The children should be able to figure out that the number of tacks a magnet can pick up and hold is an indication of its strength.

How can you make a magnet?

Help the children discover several ways to make a magnet by carrying out the following experiments.

Have the children make magnets by stroking either a screw driver blade or an iron nail with a magnet. Emphasize that they must stroke in only one direction. (Try to have enough materials so that the children can work in small groups. Solicit their help in assembling the materials.)

Have the children test the magnets they make to see if they will attract tacks, paper clips, iron filings, or other magnetic materials. What do these materials have in common? (iron or steel)

How can you make an electromagnet?

Lead the children to review the uses of electromagnets by writing on the board: Uses of Electromagnets. List the ways electromagnets are used.

Have the children read to find out how to make an electromagnet. Discuss what was read and write the pupils' directions for making an electromagnet on experience chart paper. Build a meaningful background for the words permanent and temporary as you help children discuss this kind of magnet.

Help children make an electromagnet by participating in the following activities. Take a piece of soft iron, such as a big nail or spike, and around it wind some bell wire, which can be bought at any hardware store or ordered from the warehouse. Fasten the two ends of the wire to the terminals of a dry cell. Test the nail for magnetism by picking up small objects, such as thumbtacks, paper clips, and nails. Unfasten one of the wires. Most of the objects should fall off. Test the magnet with a compass to find which end of the nail is the north pole and which is the south pole.

Now connect to the center terminal of the cell the wire which was connected to the outside terminal, and attach the other wire to the outside terminal. Test again to see which end is north and which is south. Do the poles of the electromagnet depend on the way the wires are connected? Such a magnet is called temporary.

Encourage members of the class to experiment with electromagnets to see if the poles always stay the same, even when the ends of the wires are changed on the dry cell.

Repeat the foregoing experiment, using more dry cells. See if the electromagnet is stronger.

Repeat the experiment, using one dry cell but twice as many turns of wire. The strength of an electromagnet seems to depend on the number of dry cells and the number of turns of wire.

Make an electromagnet with a core of hard steel. This may be done by wrapping wire around a screw driver, knitting needle, or a pair of scissors. Pass a current of electricity through the wire for one or two minutes. Turn off the current and test the steel for magnetism. It should be permanently magnetized, whereas the soft iron was only temporarily magnetized.

Bring in and allow the children to arrange a display of the ways electromagnets make work easier.

Have the children make reports on a typical day they might have if there were no electromagnets.

How does a compass work?

Arouse children's interest both in telling directions by a compass and in finding out how a compass works by inquiring: "If you were in an unfamiliar place, how could you tell which direction was north?"

Have a member of the class point in the direction he thinks is north. Ask others to tell why they agree or disagree. If a compass is suggested as a way of checking, find out what children know about a compass and how it works. Ask them if they have ever made a compass. If no one thinks he has, remind the children about suspending a bar magnet by a thread. Lead them to realize that the compass needle is comparable to a freely swinging bar magnet.

The science words for this section are compass, lodestone, north-seeking pole, and south-seeking pole.

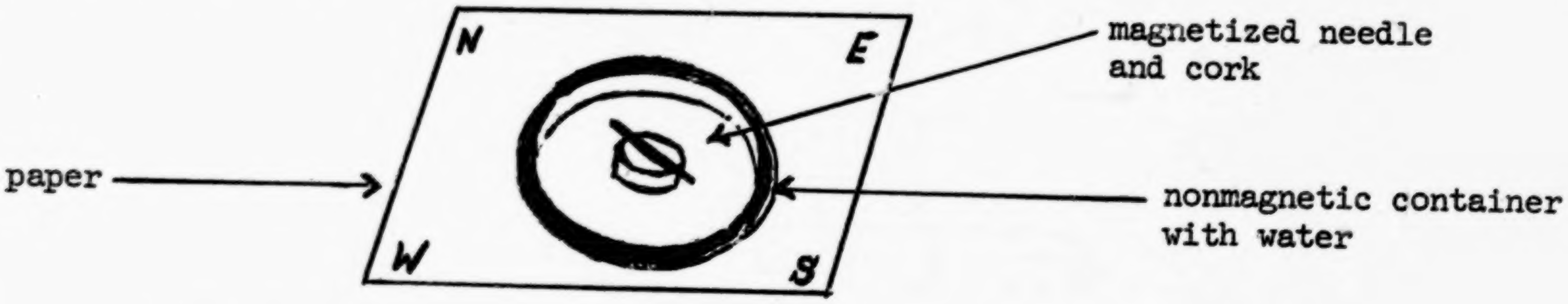
The materials needed are: steel needles; shallow nonmagnetic containers (glass, china, plastic, or aluminum); flat pieces of cork, each with a narrow groove cut across the top to hold a needle; bar magnets; thread; at least one commercial compass; a globe; and a piece of lodestone.

When the children seem to understand directions, help them make their own compasses. See if the children can suggest a way to make a compass. If not, have them do the following:

Make a magnet of the needle by stroking it with a magnet in one direction only. Test the needle to see if it is magnetized.

Cut a thin groove across the cork, and lay the needle in the groove. Fill the dish with water, and float the cork in the center so that it is free to turn without bumping the sides of the dish.

What happens? Can you guess why the N pole of a compass points toward the north?



If the children are unable to do research, explain that scientists have found that the earth itself acts like a huge magnet. The earth has poles. They are called the north and south magnetic poles.

Use the earth's magnetic field to magnetize iron. Take a piece of iron, such as an iron rod, and hold it so that is is pointing north and south, with the north end lowered toward the pole. (The farther north one lives, the more nearly vertical one should hold the piece of iron.) Strike it with a hammer a few times. The iron rod should indicate some magnetism--by repelling a compass needle, attracting iron filings, and the like.

Draw the earth's lines of force as curved paths between the two magnetic poles. The earth, like other magnets, exerts its force along these lines. A hanging bar magnet lines itself up with the earth's magnetic force. A compass needle does the same.

What does this tell us about the earth's magnetic poles? Is the north magnetic pole an N pole or an S pole?

Develop the concept that the compass needle hardly ever indicates the true north.

Help the members of the group do research on the word lodestone. Report findings to the class.

Find other evidences of the earth's magnetism by testing stationary iron and steel objects around the school building.

Lead the class to summarize how a compass works. The children should also discuss what they have learned about magnets. Have them check their list of questions at this time.

Let the children plan a culminating activity. After they have prepared the experiments and reports, they may invite another class to see what they have learned.

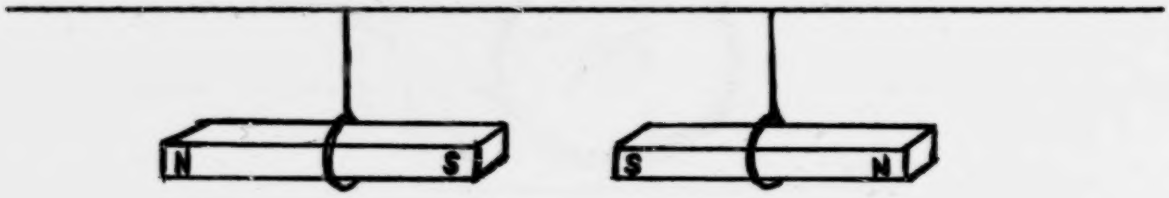
Evaluation

1. When you experiment with new materials, why should you often say "I think" instead of "I'm sure"?

2. If you dropped some pins on the floor, could you pick them up with a magnet? Explain your answer.

3. Suppose you have a bar of steel and you don't know whether it is a magnet or not. How could you find out if it is a magnet? If it is a magnet, how could you tell which is its N pole?

4.

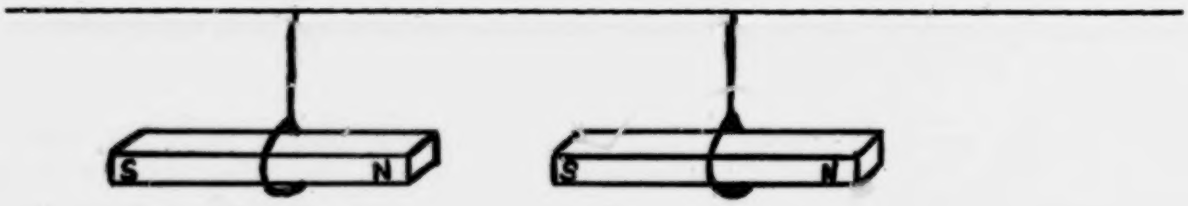


   a. When two __________ poles of a magnet are placed together, we expect them to __________ each other.

   b. Show this with arrows in the drawing above.

   c. Make your own drawing showing this below.

5.

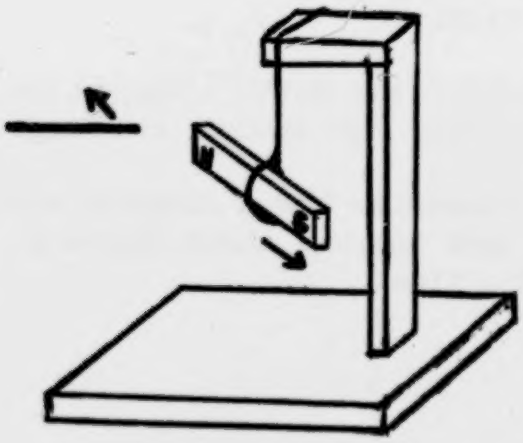


   a. When two __________ poles of a magnet are placed together, we expect them to __________ each other.

   b. Show this with arrows in the picture above.

   c. Make your own drawing showing this below.

6.

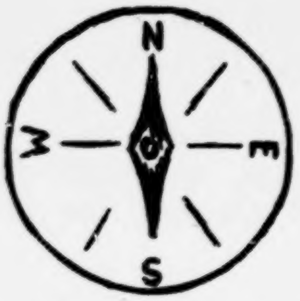


a. When a free swinging magnet is suspended, we expect the poles to line up in a certain way.

b. The N pole will swing toward the __________.

c. The S pole will swing toward the __________.

7.



a. On a compass, the needle is really a __________________.

b. The blue tip of the needle is the __________ pole of the __________.

c. The other end of the needle is the __________ pole of the __________.

d. The blue tip of the compass needle will always point toward the __________.

Audio-Visual Aids

The following aids may be ordered from the Visual Aids Exchange:

"Magnets" #1657

"Magnetism and Electricity" #6465.

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Unit: The Air Around Us

Children have many everyday experiences which reveal to them the importance of air which surrounds them. They know that they breathe air. They feel the cooling effect of cool air and the warming effect of warm air. They can see the branches of trees sway in moving air. They can smell the odors carried by air. This unit provides many opportunities for helping children become aware of the continuous change that takes place in their lives and the energy involved in effecting these changes.

When children talk freely about their experiences with air, they will ask questions. Children's questions, together with those of the teacher, will point the way to the study of air and the effect air has on their lives.

Concepts

Air has weight and exerts pressure.

Air is a mixture of invisible gases, minute solid and liquid particles.

Air is found in every space on earth that is not otherwise filled.

Air expands when heated and contracts when cooled.

Air is used by man in many ways.

Skills to Be Emphasized

In developing the above concepts through carrying out a study of the experiences of this unit, the following ways of working in science seem especially important:

Learning to frame questions that will help in carrying out a study of air

Learning simple laboratory techniques to experiment with air

Learning to repeat experiments a sufficient number of times to gain reliable data about the effect of heat energy on air

Learning to look for applications of principles that have been discovered about air.

Investigations

Does air have weight?

How can you show that air has weight?

Drill holes in a yardstick (most hardware stores give them away) at the 6-inch, 18-inch, and 30-inch marks. Fill a basketball with air. Suspend the yardstick from a string through the middle hole. Suspend the blown-up basketball from one end hole and a tin can from the other end hole. Fill the tin can with sand until the yardstick balances. Release all of the air from the ball. What happens? What does this show about air?

Can air pressure hold water in a tumbler?

Fill a glass tumbler with water. Place a piece of stiff paper or cardboard on top of the glass, and hold it in place with the hand. Be careful not to let any bubbles of air enter between the cardboard and the glass. Invert the tumbler while holding the cardboard in place. Remove the hand carefully from below the paper or cardboard. How can we explain what happens? Where is the pressure greater? Why do we put two holes in a can of liquid we want to empty?

How strong is air pressure?

Bring to class a piece of wood about the width of a ruler, two or three feet in length, and no more than one-eighth inch thick. Place the wood on the table so that nearly half of it extends over the edge. Lay two or three sheets of newspaper over the end of the stick, and smooth it down carefully. Give the outer end of the stick a sharp blow with a hammer. Why do you think the stick breaks?

Does air take up space?

When you look at a glass and cannot see anything in it, you might say the glass is empty. But is it empty?

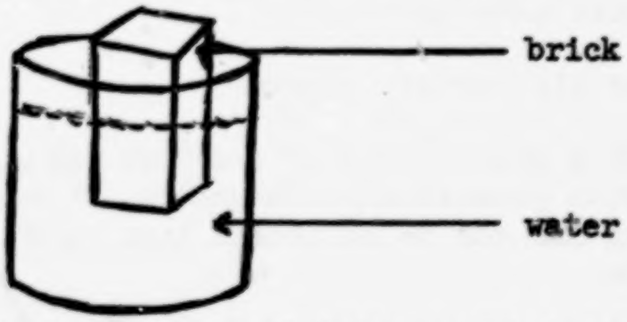
Float a cork on a large glass container half-full of water. Lower a drinking glass, mouth downward, over the cork. What do you observe?

Stuff a handkerchief or a piece of paper into this "empty" glass so that it will not fall out. Push the glass into the container of water. Be sure to hold the mouth of the glass straight down. Observe. Now take the glass from the water, and pull out the handkerchief. Is the handkerchief wet?

Lower an "empty" glass, mouth downward, into the water. Tilt it. What happens? Now place another "empty" glass down beside the one that is filled with water. Tilt the second glass so that a bubble comes out. Catch the bubble in the first glass. What is the bubble?

Place a handful of soil in a container of water, and observe. What do you see?

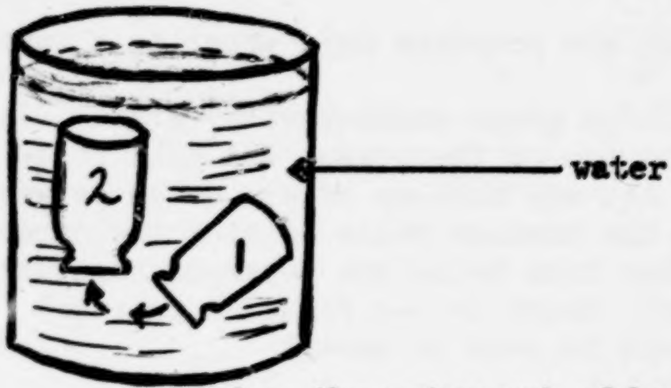
Place a brick in a container of water. What do you observe?



When you push a glass straight downward into a container of water, the water does not enter the glass because:

1. Air takes up ________.

2. No substance takes up the same ________ at the same time.



The air in bottle number _________ pushes the water out of bottle number _________ and replaces the water with air.

How does heat affect air?

All substances are composed of molecules that behave in a certain way when heated. Develop the meaning of the word, molecule.

Use an 8-ounce Pyrex baby-feeding bottle. It should be the narrow-neck type of bottle. Place a balloon over the mouth, and secure it tightly. Place the Pyrex bottle with the balloon attached on a hot plate. What does the balloon do? Plunge the balloon in ice water. What happens?

Blow air into a round-type balloon. Hang the balloon over a hot plate or a radiator. Measure the circumference of the balloon with a tape measure before placing the balloon over the hot plate. Then measure it at intervals of three minutes. Have the children keep a record of the experiment. Try it again with a new balloon. Compare results. Then, try it again. But this time hang the balloon in the sun, and allow sunlight to heat the air within the balloon. Compare results.

How does man use air to do work?

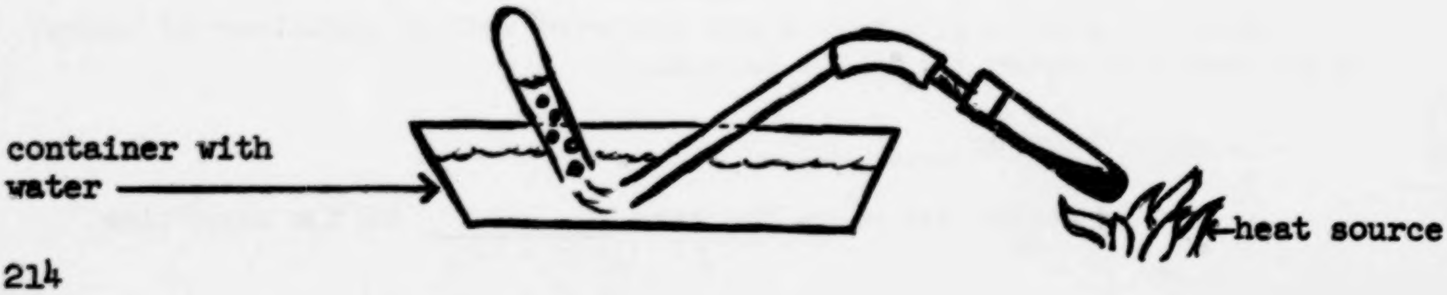
Put a paper bag on the edge of the table. Place a book on top of it. Now grasp the end of the bag between your thumb and fingers. Blow into it. Put two books on an empty sack. Blow into the bag again. Put on more books, and blow once more. What does this tell us about air?

Have the children make a study of the ways in which air is used to lift objects. How does an automobile lift work? How is air used to operate other devices? Have the children build a model of the caisson, and make a report on how it works.

What substances make up the air?

Does the air contain oxygen?

Seal off a short piece of ordinary tubing to make a test tube. Fill it halfway with potassium permanganate. Connect a delivery tube and heat. (Oxygen given off can be collected over water in a soup plate.) Quickly, cork the tube.



To test the gas in the tube for oxygen, light a long wooden splinter and blow out the flame. Remove the cork from the tube, and insert the glowing splinter into the gas inside the bottle. What happens?

Fasten a bit of steel wool to the end of a wire. Light it, and quickly lower it into a bottle containing oxygen. Does it burn more rapidly in oxygen than in air?

Does the air contain carbon dioxide?

Pour some clear limewater into a small jar. Blow through a drinking straw into the limewater for a few seconds. What color does the limewater turn? Would the same thing happen if the limewater were exposed to the air for some time?

Place a small jar at the bottom of a large-mouth Mason jar. Pour vinegar into the small jar. Then add baking soda to the vinegar. Quickly place a lid over the large jar. Lower a burning candle by means of a wire into the "empty" jar. Then lower it into the jar with the vinegar and baking soda. What happens when the candle is lowered into the jar without the vinegar and baking soda? What happens when it is lowered into the jar with the vinegar and baking soda? What gas is present? How can it be used? Is there water in the air? What relationship is there between the amount of oxygen and the amount of carbon dioxide in the air?

What other substances may be in the air?

Put some water on one of your forefingers, and hold it up in the air to dry. What becomes of the water? Why does your finger feel cool?

Put some alcohol on the palm of your hand. Where does the alcohol go?

Take the reading of a thermometer. Soak a piece of cotton in alcohol and fasten it to the thermometer bulb with a rubber band. Swing the thermometer back and forth through the air. As the alcohol evaporates, what happens to the mercury in the thermometer? What is the reading after some evaporation has taken place?

Fill one glass with water Fill a second glass about two-thirds full, and add several cubes of ice. How does the outside of the glass look? How does the outside of the glass which contains plain water (no ice) look? How can we explain this?

Allow a beam of sunlight to enter a darkened room. What do you see in the shaft of sunlight?

Resources

See the Visual Aids Handbook for listings of appropriate films and filmstrips.

Unit: The Earth's Resources

The earth is the only known planet that has all the things we need in order to live: air, water, and soil in which to grow things. The earth supplies us with other important materials which we have learned to use. These materials are found on and under the surface of the earth. Man must dig and drill to get them.

Concepts

The earth is composed of many materials that can be used by man.

Materials have certain properties that make them useful.

Materials can be removed from the earth in various ways.

Materials have characteristics which make them similar to or different from other materials.

New materials can be made by combining others in a specific way.

It is important to conserve our natural resources.

Skills to be Emphasized

In developing the above concepts through carrying out the experiences of this unit, the following ways of working in science seem especially important:

Learning to make accurate observations

Learning to keep simple records of observations in ways that are helpful for future learning

Learning simple laboratory techniques used in experimentation

Learning to gather information from resource materials and to organize it.

Investigations

How do we use materials from the earth?

What are our houses made of?

Solicit the children's help in bringing in samples of materials that are used in our houses. Make a display of these materials and their uses.

Plan a tour of the school. Point out the many different materials. Why are certain materials used in particular places? Develop a list of questions such as:

Why do we have windows? Of what is glass made?
What kind of wire is used to bring electricity into buildings? Why is it used instead of other kinds of wire?

Why is copper used for water pipes and for flashing around the chimney?
Why is concrete used for foundations and sidewalks?
How is iron used in buildings?
What different kinds of materials can be used for roofing?

How can we prove that some materials are better suited for some jobs than for others?

Let the children select different samples of materials that may be used for one purpose. Help them plan a controlled experiment to determine which is the best. It might be the strongest, lightest, most water resistant, rustproof, easiest to form, or best for keeping out the heat or cold.

How do we locate these materials?

The teacher may have to rewrite material for this purpose. Or, he can read and help the children to summarize what is read. Have the children draw maps, using geography books, to show the location of various materials. A picture map is well suited for this purpose.

In what form are some of these materials before refinement?

Ask the children to obtain samples of the raw ore and place them in plastic bags. These could be properly labeled and put on display.

How do we get these materials from the earth?

What are the different types of mining that are used to remove raw materials from the earth?

Again, the teacher may have to rewrite or read the material. Have the children make pictures and diagrams to show the various methods of mining.

How are some of these materials formed?

How is coal formed? Have a variety of supplementary books and texts simple enough for the children to use. What are the different kinds of coal? How are they used?

How is oil formed? The search for this information should bring an interest in the age of the earth and some interest in prehistoric times. Have the children make charts showing the type of life that lived on earth during past ages.

Write to the department in the state that regulates the mining process.

What useful properties do materials have?

In what ways are materials alike? How do they differ?

Collect a variety of items. Have the class discuss the hardness or the softness of the materials; the smoothness or roughness; whether they bend or stretch easily; whether they are magnetic or nonmagnetic, and the like. Such activities will develop the meaning of the word, property. Develop a chart showing these properties. In addition to the properties, the chart might also show how the materials are used in the home or in buildings, and where they are found.

How do we make new materials?

There is a precise order in making some materials.

Mix cement with a measured amount of sand and water. Mix the same amount of cement with twice as much sand and water. Let the mixture set for two days. Is the material different from the ingredient materials? Does the new material have any of the properties of the original materials? Which of the new materials will do a better job? What are alloys of metals?

How can man help to conserve natural resources?

Refer pupils to texts and supplementary books to find answers to questions similar to the following:

Why is it important to conserve materials? What are some of the most important materials? Where do they come from? How long does it take such materials as coal to form? What materials cannot be replaced? What can be done with some scrap materials, such as iron or copper?

Help the children develop a summary statement of learnings.

Resources

Audio-Visual Aids.--See the Visual Aids Handbook and Museum of Natural History Handbook for listings of films, filmstrips, specimens, and museum cases.

Field Trips and Excursions.--Planned programs related to this unit are available at the Museum of Natural History. Informal trips are helpful.

Unit: The Growth of Living Things

Children are usually very interested in living things. They like to care for plants and animals. They enjoy watching them grow.

This unit permits children to strengthen their interest and curiosity in living things and to develop an understanding of the relationships that exist between living things and their environment.

Concepts

Living things have different types of requirements necessary for the maintenance of life.

Plants grow in many ways.

Animals change as they grow.

Skills to Be Emphasized

In developing the above concepts through carrying out the experiences of this unit, the following ways of working in science seem especially important:

Developing an experimental approach to determine the needs of living things

Learning to generalize about cause-and-effect relationships and to check their generalizations with authoritative sources

Learning to plan and complete simple records of observation.

Investigations

What do plants need in order to grow?

Do plants need sunlight?

Discuss the conditions under which a variety of plants seem to thrive. Make a list of the comments expressed. Challenge the pupils to transpose the comments into action. Develop a plan for testing ideas similar to the following:

Obtain two geranium plants that are as much alike as possible. Examine each plant. Check them to see that both of them are healthy plants growing in the same kind of soil.

Place one plant in the sunlight and the other one in a dark cupboard. Water each plant (same amount) each day. Every two days, bring the plants together and make observations. How are they changing?

Decide who shall be responsible for each step.

Discuss the result of this experiment.

How can this experiment help us become more successful in growing plants?

Use other questions for controlled plant study such as:

Do roots seek water?

What kind of soil is best for grass seed?

Do sprouting seeds exert pressure?

How do plants grow?

What plants grow from seeds?

Plant seeds of various kinds in flats. Label each flat. Make a chart for measuring their growth.

Moisten a sponge, and cover it with grass seed. Plan and complete a simple record of observations.

What plants grow from bulbs?

Suspend a sweet potato with tooth picks in a Mason jar so that the tip is in water. Keep it in a sunny window, and watch for sprouts. What other plants grow from bulbs?

What plants grow from roots?

Collect root vegetables, such as carrots, beets, and white turnips. Trim off stubs. Place in shallow dishes with water and pebbles. Watch for new life. Can these plants be grown from seeds?

What plants grow from leaves?

Place a mother-in-law tongue leaf in water. Observe how new growth takes place.

What plants grow from cuttings?

Get a stem cutting of a Wandering Jew Plant. Place it in water or damp soil. Keep a record of the number of days required for new life to begin.

How does new growth take place in trees and shrubs?

What do animals need to live?

What do the fish in our aquarium need in order to live?

Have the children help set up an aquarium. Stimulate them to observe, to ask, and to answer questions such as:

Can a fish remain in one spot?
Do the fins always move?
How many fins are there?
What is the purpose of the tail? Does a fish ever swim backwards?
Where are the eyes placed? Does a fish ever close his eyes? What is the covering on its body?
Does the fish eat its food from the top of the water, from the bottom, or in the middle?
What does it eat? What is the temperature of the water? What does the fish do with its mouth?
Can you see something that opens and closes on the side of its head? How does the fish get air?

Observations may be supported by simple research.

Look for spider webs. Are there any insects trapped in the web? Can you find the spider? If a spider is placed in a closed jar with some twigs, will it spin a web? Will it lay eggs? It will be necessary to add food (usually living insects) and a few drops of water if the spider is kept for any length of time.

How do animals change as they grow?

What animals are similar to their parents from birth?

Discuss with the children the animals that resemble their parents when born. Find pictures of these animals. Make a display or mural.

Do some animals go through different forms as they grow?

In the springtime, gather frogs' or toads' eggs, and place a few of them in a large tank with plants and pond water (aquarium water will do). Watch as the eggs change into tadpoles, and tadpoles develop into toads or frogs. Help the children find out what their needs are and plan for their care. Make charts showing the stages in the development of a frog from egg to adult.

Gather facts and pictures about the life cycles of moths, butterflies, mosquitos, and silkworms.

Have the children bring cocoons. Make homes for them.

Discuss the interdependence of animals and plants.

Resources

Audio-Visual Aids.--See the Visual Aids Handbook and Museum of Natural History Handbook for listings of films, filmstrips, specimens, and museum cases.

Books.--See bibliography in the science section of the Intermediate Manual, Revised.

Field Trips and Excursions.--The child's own neighborhood is very helpful in developing understandings in this area.

(See back of page for science bibliography.)

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